ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 9.] [1908.

## XLVII.—A NEW SPECIES OF BUTEA, WITH NOTES ON THE GENUS.

The genus *Butea*, proposed by Koenig to accommodate the 'Palas' or 'Dhak'—a well-known and striking Indian tree—and to commemorate the services to botany of the third Lord Bute, was published by Roxburgh (*Pl. Corom.*, vol. i. p. 21) in 1795. To the 'Palas,' which had already been figured by Rheede in 1686 (*Hort. Malab.* vol. vi. tt. 16, 17) and had been named *Erythrina monosperma* by Lamarck in 1783 (*Encyc. Meth.* vol. i. p. 391), Roxburgh added a second species, which differs in having larger flowers with longer pedicels, and in being a climber with stems that rise from a hypogaeal tuber-like base. The erect species Roxburgh named *B. frondosa*; the climber he termed *B. superba*. The diagnostic characters of *Butea* given by Bentham in 1865 (*Gen. Pl.* vol. i. p. 533) and by Taubert in 1894 (*Nat. Pflanzenfam.* vol. iii. 3, p. 365) apply precisely to Koenig's original genus. Bentham, however, and in this he was followed by Taubert, admitted the existence of a third species, *B. minor*, Ham., which is not precisely covered by these diagnoses.

In 1813 Roxburgh widened the scope of Koenig's genus by admitting another species, *B. parviflora* (*Hort. Beng.* p. 53), which was fully described in his posthumous flora (*Fl. Ind.* vol. iii. p. 248) in 1832. This species agrees with *B. superba* in habit and foliage; it differs in having a panicled inflorescence of more numerous, much smaller flowers, and has been referred by Bentham and Taubert to another genus.

In 1825 De Candolle (*Prodr.* vol. ii. p. 414) accepted the genus as enlarged by Roxburgh in 1813, and doubtfully added another species, *B. Braamiana*, DC., believed to be from China. This species was taken up from t. 23 in a collection of thirty drawings issued by Bohte in 1821 as 'Icones plantarum sponte Chinâ nascentium e bibliotheca Braamiana excerptae.' No *Butea* has been met with in China, and it is now known that Bohte's title page is slightly in error, for the same collection of thirty plates, arranged in a different sequence, was advertised by Cattley in 1818—in this

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case accurately—as a series of drawings of Chinese and Indian plants. The plate which forms t. 23 of Bohte's issue is t. 4 of Cattley's edition; it is one of the Indian drawings and represents with fidelity *B. frondosa* while in young foliage.

In 1826 Sprengel (*Syst. Veg.* vol. iii. p. 186) did not take up *B. parviflora* or *B. Braamiana*; he added, however, to Koenig's genus another species, *B. Loureirii*, based on *Genista scandens*, Lour. (*Fl. Cochinch.* vol. ii. p. 428); this plant, from internal evidence, we know must belong to another genus.

*B. minor*, Ham., which Bentham and Taubert have accepted as a *Butea*, was obtained from Nepal by Buchanan (afterwards Hamilton) in 1810. The species was not taken up in 1825 by D. Don (*Prodr. Fl. Nep.*); it was, however, issued by Wallich in 1830 (*Cat. Lith.* n. 5439 A) along with specimens of the same species (5439 B) collected by De Silva in the mountains of Silhet, i.e., the Jaintea Hills. Griffith met with it again in the same locality in 1837 as a gregarious shrub and sent a supply of seeds, under the name *B. suffruticosa*, to Voigt at Serampore; this name was subsequently published in Griffith's works (*Notul.* vol. iv. p. 443) in 1854.

In 1842 Hasskarl (*Flora*, vol. xxv. 2, *Beibl.* p. 52) proposed a genus *Spatholobus* for a Java plant, *S. littoralis*, with a pod like that of *B. parviflora*, and in 1846 Zollinger and Moritzi (*Nat. Gen. Arch. Ind. Ned.* vol. iii. p. 79) based a genus *Drebbelia* on another nearly allied species. Bentham in 1854 (*Miq. Pl. Jungh.* p. 238) reduced *Drebbelia ferruginea*, Zoll. & Mor., to *Spatholobus* as *S. ferrugineus* and at the same time reduced *B. parviflora*, Roxb., to Hasskarl's genus as *S. Roxburghii*—the term 'parviflora,' appropriate when used as Roxburgh used it, being meaningless when the species has to be reduced to *Spatholobus*.

In 1845 Voigt (*Hort. Suburb. Calcutt.* p. 239) accepted *B. parviflora*, Roxb., as a *Butea*. But on raising plants of *B. minor* from the seeds given him by Griffith in 1837 Voigt decided that this species is not a *Butea*, and published it, with a generic diagnosis, as *Meizotropis buteaeformis*. A detailed description, subsequently prepared by Griffith from living specimens in Voigt's garden, was published in 1854 (*Griff. Notul.* vol. iv. p. 441). Owing to an error the word *Meizotropis* appears there as *Megalotropis*, and this erroneous form is cited in the *Index Kewensis* and used by Taubert as if it were a new generic name proposed by Griffith. This citation does not represent Griffith's intention, since Griffith himself attributes the name to Voigt. It is not impossible, though it is unlikely, that Griffith by a *lapsus calami* wrote *Megalotropis* instead of *Meizotropis*; in all probability the altered orthography is one more instance of the editorial laxity conspicuous throughout Griffith's posthumous papers. We know, indeed, from a manuscript name attached by Griffith to a fruiting specimen of *B. minor* from the Serampore garden, that his final view was that the plant is a *Butea*.

The divergence of view as to the status and limits of *Butea*, Koen. (based on *B. superba* and *B. frondosa*), of *Meizotropis*, Voigt (based on *B. minor*), and of *Spatholobus*, Hassk. (to which *B. parviflora* has, since 1854, been uniformly referred), invites a

reassessment of their differential characters. In habit and foliage *B. superba*, *B. minor* and *B. parviflora* are so similar that without flowers one might be confused with either of the others. In fruit all three agree. As regards calyx, stamens and pistil they differ only in size; in this respect *B. minor* with calyx 8 mm. long, stands about midway between *B. superba* with calyx 16 mm. long, and *B. parviflora* with calyx 4 mm. long. As regards corolla the three, as the characters detailed below indicate, differ almost equally :—

**Butea**, Koen. (1795); vexillum ovatum, acutum, recurvum; alae falcatae, acutae, carinae parum adhaerentes; carina valde incurva, acuta, vexillum alasque aequans; petala aurantiaca; flores insignes, 5-7 cm. longi.

**Meizotropis**, Voigt (1845); vexillum ovatum, subobtusum, recurvum; alae oblique oblongae, liberae; carina incurva, subobtusa, vexillum alasque superans; petala aurantiaca; flores mediocres, 1·75–2·75 cm. longi.

**Spatholobus**, Hassk. (1842); vexillum ovatum vel suborbiculatum; alae oblique oblongae, liberae; carina rectiuscula, obtusa, vexillo alisque brevior; petala purpurea, rosea vel alba; flores parvi, 0·6–0·9 cm. longi.

From this we see that while *Meizotropis* agrees with *Butea*, in which it is included by Bentham and Taubert, as regards colour of petals, it agrees better with *Spatholobus*, which Bentham and Taubert refer to another subtribe, as regards the shape and relationship of the wings. Since the characters to be derived from the corolla are insufficient to warrant the generic separation of *Meizotropis* from *Butea*, they must be equally inadequate to warrant the generic separation of *Spatholobus* from the widened *Butea* in which *Meizotropis* is merged. The segregation of *Spatholobus* is so convenient that its perpetuation is desirable, but it has to be recognised that this segregation depends entirely on a difference of facies resulting from the possession of a greater number of smaller and differently coloured flowers, and is unsupported by any morphological character. This being the case, it seems clear that, even if the generic status accorded to *Spatholobus* can be upheld, we are not entitled to refer that genus to a subtribe apart from the one in which *Butea* (including *Meizotropis*) is placed.

It is just as convenient, considering the small number of species involved, to follow Bentham and Taubert in uniting *Butea* and *Meizotropis* as it is to follow them in keeping *Spatholobus* apart. Since, however, the definitions given by these authors are so framed as to exclude the species *B. minor*, which they have formally included in *Butea*, it is desirable to accord sectional rank within their *Butea* to the group *Meizotropis*, proposed as a genus by Voigt. The recent communication of a hitherto unknown Indian species, closely allied to *B. minor*, Ham. (*Meizotropis buteaeformis*, Voigt), renders the recognition of this section almost essential.

The plant in question was sent from Patwa Dangarh, near Naini Tal in the Kamaon Himalaya, by Capt. C. A. Sprawson, I.M.S., to Sir J. D. Hooker, who has named it *B. pellita*, and has presented

the material to Kew with the request that a description of the species be provided. Capt. Sprawson states that the plant is known locally as 'Patwa,' a name that in the plains of India is applied to the Rozelle (*Hibiscus Sabdariffa*); that it gives its name to the place—Dangarh connotes a small plain among the hills—in which it grows; that the natives say the plant is limited to this particular hill-top and cannot be found elsewhere. Captain Sprawson is satisfied that whether it occurs in places more remote or not, it is certainly restricted in the neighbourhood of Naini Tal to the particular area, less than a mile square, whence his specimens come. Probably, therefore, the plant is at least local in its occurrence, and this may partly explain the absence of so striking a species from previous collections. Capt. Sprawson's specimens in fruit were gathered in October, 1907; flowering specimens were subsequently obtained by him in June, 1908.

Another circumstance almost sufficient, in the absence of fruit, to explain this plant having been overlooked is the close resemblance it bears to *B. minor*, Ham., a species which inhabits the Assam hills to the east of the river Brahmaputra and the Himalaya from Sikkim westward to Kamaon. The tomentum is somewhat lax in *B. pellita*, closely adpressed-silky in *B. minor*; otherwise there is nothing to distinguish the adult leaves of the two; in both cases the largest leaves frequently attain a length and breadth of three feet. Usually *B. minor* is a heavy climber, whereas *B. pellita*, so far as we yet know, is a shrub rarely exceeding four feet in height. Sometimes, however, *B. minor* is a gregarious shrub; we have seen that Griffith, who found the species in this condition in the Jaintea Hills in 1837, used for the erect form the distinctive name *B. suffruticosa*. On casual examination the flowers of *B. pellita* might be mistaken for those of *B. minor*; they are the same in colour, and the petals of both impart a rich orange tint to water in which they are placed; the only distinguishing features are that the tomentum on the calyx and petals of *B. pellita*, like that on the young leaves, is suberect and velvety, whereas the tomentum on these organs in *B. minor* is, like the leaf-tomentum, closely adpressed, and that the flowers of *B. pellita* are distinctly smaller, being only 1·75 cm. long as against 2·75 cm. long in *B. minor*.

Closely related, however, as the two species are, their fruits are very different. In *B. minor* the pod is like that of *B. superba* or of *Spatholobus Roxburghii* (*B. parviflora*); it has a long flat indehiscent empty basal portion with a short thick 1-seeded 2-valved apical chamber. In *B. pellita* the pod, though 1-seeded by abortion of the lower of the two ovules, has the solitary seed some distance below the organic apex, and is more like that of a *Dioclea* than that of a typical *Butea*. This striking difference, however, is not greater than the difference which exists in *Hypaphorus*, Hassk., as compared with *Erythrina*; and since in the latter case the character is insufficient to warrant the treatment of *Hypaphorus* (*Erythrina lithosperma*) as generically distinct from *Erythrina* proper, it is necessary, for the sake of uniformity, to consider *B. pellita* a member of *Butea* § *Meizotropis*.

A brief revision of *Butea*, Koen., in accordance with the considerations stated above, is subjoined.

**Butea,** *Koen.*; *Benth. in Benth. & Hook. f. Gen. Pl.* i. 533 (1865); *Taub. in Engl. & Prantl, Nat. Pflanzenf.* iii. 3, 365 (1894); calycis dentes vel lobi breves, 2 superiores connati; vexillum ovatum, recurvum; carina incurva; stamen vexillare liberum, caetera connata; antherae uniformes; ovarium 2-ovulatum; stylus elongatus, incurvus, imberbis, stigmate terminali minimo; legumen 1-spermum; semen plano-compressum, obovatum, hilo parvo estrophiolato; folia pinnatim 3-foliolata, stipellata; stipulae caducae; flores aurantiaci, dense fasciculati, fasciculis racemosis vel fasciculato-paniculatis; bracteae et bracteolae caducae.

§ 1. **Eubutea**; vexillum acutum; alae falcatae, acutae, carinae parum adhaerentes; carina acuta, vexillum alasque aequans; legumen basi longe planum indehiscens et vacuum, summo apice crassum 2-valve; flores insignes. *Butea*, Koen. ex Roxb. Pl. Coromand. i. 21.

1. **B. frondosa,** Roxb.; arbor; pedicelli calyce vix duplo longiores; flores 5 cm. longi. *Pl. Corom.* i. 21, t. 21 (1795); *Fl. Ind.* iii. 244; *DC. Prodr.* ii. 415; *W. & A. Prodr.* 261; *Brand. For. Fl.* 142; *Hook. f. Fl. Brit. Ind.* ii. 194. B. Braamiana, *DC. Prodr.* ii. 445 (1825). B. monosperma, *Kuntze Rev. Gen.* 202 (1891); *Taub. in Engl. & Prantl. Nat. Pflanzenf.* iii. 3, 365. Erythrina monosperma, *Lamk. Encyc. Meth.* i. 391 (1783).

DISTRIB. Throughout India and Burma. The leaves of this species are occasionally 1-foliolate; a specimen showing this abnormality has recently been communicated to Kew by Mr. Hole, of the Indian Forest Service.

2. **B. superba,** *Roxb.*; frutex alte scandens; pedicelli calyce triplo longiores; flores 7 cm. longi. *Pl. Corom.* i. 23, t. 22 (1795); *Fl. Ind.* iii. 247; *DC. Prodr.* ii. 415; *W. & A. Prodr.* 261; *Brand. For. Fl.* 143; *Hook. f. Fl. Brit. Ind.* ii. 195.

DISTRIB. Throughout India and Burma.

§ 2. **Meizotropis**; vexillum subobtusum; alae oblique oblongae, obtusae, liberae; carina subobtusa, vexillum alasque superans; flores mediocres. *Meizotropis*, Voigt. Hort. Suburb. Calcutt. 239; Griff. Notul. iv. 441 (sphalm. *Megalotropis*).

3. **B. minor,** *Ham.*; frutex saepius alte scandens nonnunquam erectus; folia floribusque adpresse sericea; legumen basi longe planum indehiscens et vacuum, summo apice crassum 2-valve; flores 2·75 cm. longi. *Ham. in Wall. Cat.* 5439 A (1830); *Hook. f. Fl. Brit. Ind.* ii. 195. B. suffruticosa, *Griff. Notul.* iv. 443 (1854). Meizotropis buteaeformis, *Voigt Hort. Suburb. Calcutt.* 239 (1845); *Griff. Notul.* iv. 441 (*sphalm.* Megalotropis).

DISTRIB. Assam: Khasia, *Hooker & Thomson!* Jaintea, *De Silva! Griffith!* Naga Hills, *Clarke!* Mishmi, *Griffith!* Himalaya: Sikkim, *Gamble!* Nepal, *Buchanan* (*Hamilton*)*!* Kamaon, *Duthie!*

4. **B. pellita,** *Hook. f.*; frutex erectus; folia juniora floribusque velutina; legumen basi vacuum hand elongatum infra apicem 1-spermum; flores 1·75 cm. longi.

*Frutex* erectus metralis vel paullo ultra, innovationibus ubique dense velutinis. *Folia* pinnatim 3-foliolata, adulta parce praecipue subtus et praesertim secus nervos pilis albidis obsita; foliola 30–60 cm. longa, 25–50 cm. lata; petioli 10–20 cm., petioluli 1 cm. longi; stipelli lanceolati, foliacei, 1 cm. longi, 4 mm. lati; stipulae foliaceae, triangulari-ovatae, subacutae, 2 cm. longae, 1·5 cm. latae, caducae. *Flores* aurantiaci, dense fasciculati, fasciculis 3–5-floris inter se ·5–1·5 cm. remotis racemosis; racemi axillares, 20 cm. longi, rhachidibus sublignosis angulatis nodosis 4 mm. crassis; bracteae stipellis conformes; bracteolae bracteis simillimae nisi minores; pedicelli graciles, 5 mm. longi. *Calyx* campanulatus, intus sericeus, dentibus brevibus 2 superioribus in labium integrum connatis, 7 mm. longus, 5 mm. latus. *Corollae* vexillum ovatum, subobtusum, recurvum, inappendiculatum, 1·25 cm. longum, 1 cm. latum; alae oblique oblongae, obtusae, incurvae, liberae, 1·5 cm. longae; carina incurva, petalis apicem versus tantum connatis, subobtusa, 1·75 cm. longa. *Stamen* vexillare liberum; caetera connata; antherae uniformes. *Ovarium* sessile, 2-ovulatum; stylus incurvus, imberbis, stigmate terminali parvo. *Legumen* subsessile, ovato-oblongum, coriaceo-lignosum, velutinum, paullo infra summum apicem 1-spermum, basi vacuo hand elongatum, 8 cm. longum, 4·5 cm. latum. *Semen* plano-compressum, suborbiculare, 2 cm. diametro, testa castanea, hilo parvo estrophiolato.

DISTRIB. Himalaya: Kamaon; Patwa Dangarh, near Naini Tal, 1530 m., *Sprawson!*

SPECIES EXCLUDENDAE.

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| Butea acuminata, *Wall.* | = | Spatholobus acuminatus, *Benth.* |
| gyrocarpa, *Grah.* | = | gyrocarpus, *Benth.* |
| Loureirii, *Spreng.* | = | Quid? *vide infra.* |
| parviflora, *Roxb.* | = | Spatholobus Roxburghii, *Benth.* |
| peltata, *Pers.* | = | Rudolphia peltata, *Willd.* |
| sericophylla, *Wall.* | = | Spatholobus Roxburghii, *Benth.* |
| volubilis, *Pers.* | = | Rudolphia volubilis, *Willd.* |

*B. Loureirii*, Spreng. (*Syst. Veg.* vol. iii. p. 186), is based on *Genista scandens*, Lour. (*Fl. Cochinch.* vol. ii. p. 428 (1790); ed. Willd. vol. ii. p. 521). In 1793 Willdenow queried the reference of Loureiro's plant to *Genista*. The fact that it has 2-pinnate leaves shows that it cannot be a *Genista*, as Loureiro thought, and proves that Sprengel's suggestion is equally untenable. While, however, it is certain that the species is not a *Butea* its identity is not altogether clear.

*Genista scandens* is described by Loureiro as a large climber armed with numerous simple short scattered recurved spines; it has 2-pinnate leaves with ovate entire opposite leaflets. The flowers are yellow, disposed in large lax terminal pendulous racemes; the corolla is papilionaceous with an oblong reflexed standard; the ten stamens are united. The pod is subrotund, compressed, glabrous, with a solitary large compressed seed.

Unfortunately, as Dr. Rendle, who has kindly interested himself in this matter, informs us, the type of *G. scandens* is not present among the Loureirian specimens at the British (Natural History)

Museum; we are therefore only able to guess at the species intended. All the large Asiatic armed leguminous climbers that have 2-pinnate leaves belong to the tribe *Eucaesalpinieae*, and as these never have papilionaceous corollas and always have free stamens, it is clear that Loureiro has either described the flowers of *Genista scandens* incorrectly or has mistaken the flowers of another plant for those of his species. The fact that *Genista scandens* has 1-seeded pods considerably narrows the field of enquiry. The only genus of *Eucaesalpinieae* in which the pod is uniformly 1-seeded is *Pterolobium*; this genus we are able to exclude since its pods are samaroidly winged and not subrotund. In the remaining Asiatic genera of this tribe there are only three species with 1-seeded pods, viz. :— *Mezoneuron cucullatum*, W. & A., a species as common in Cochin-China as it is in India; the species described as *Mezoneuron sinense*, Hemsl. (*Journ. Linn. Soc. Bot.*, vol. xxiii., p. 204), a Central Chinese plant, which is really a species of *Caesalpinia* § *Nugaria* (*Journ. As. Soc. Beng.*, vol. lxvi. 2, p. 470); and *Caesalpinia* (*Nugaria*) *Nuga*, Ait., a species widely spread throughout South-eastern Asia, and especially plentiful along the swampy margins of tidal rivers. *Mezoneuron cucullatum* is the species which the remarks of Loureiro as to the size of his plant and to the pleasing effect produced by its masses of yellow flowers most naturally suggest. This species nevertheless is to be excluded owing to the fact that its pods are oblong and much longer than broad. *Caesalpinia sinensis*, Prain (*Mezoneuron sinense*, Hemsl.) may also be excluded since it does not extend so far southward as Cochin-China, and it is almost safe to conclude that *Butea Loureirii*, Spreng. (*Genista scandens*, Lour.) is *Caesalpinia Nuga*, Ait. (*Guilandina Nuga*, Linn.). The element of doubt which must necessarily exist owing to the account given by Loureiro of the corolla and stamens should be removed without difficulty by observation in the field since the species intended is said by Loureiro to be plentiful in Cochin-China near the banks of rivers, climbing to the tops of the highest trees; Loureiro gives besides a vernacular name, 'Cây Gieng-gieng,' which ought to facilitate the identification of his plant.

D. Prain.

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## XLVIII.—SOME CONTINENTAL GARDENS AND NURSERIES.

W. J. Bean.

In June last, at the instance of the Director, I spent 24 days on the Continent visiting as many famous gardens, parks and nurseries as time permitted. The objects of this journey were, primarily, to observe new and different methods of culture; to note plants not in the tree and shrub collections at Kew with a view to their acquisition; and to study landscape effects. The chief towns and cities I visited were Brussels, Rotterdam, Leer, Bremen, Hanover, Berlin, Dresden, Prague, Vienna, Ischl, Munich, Nancy and Paris.

Most of these places possess what we know as a continental climate ; that is to say the winters are colder than those of Britain, and the summers much hotter. These extreme conditions as to temperature result, generally, in a great reduction in the number of evergreens that can be grown as compared with Britain, but, on the other hand, in a finer development of many deciduous flowering trees which in our country are very subject to injury from spring frosts. Thus some of the deciduous American, Asiatic, and Caucasian trees, which I saw in considerable numbers, are only to be equalled in Great Britain, by a specimen out of the common, here and there. But, so far as I was able to observe, there is nothing in Central Europe to equal the Asiatic and West American conifers as one sees them grown, for instance, in the gardens of Perthshire. Each type of climate has its advantages and disadvantages, but, on the whole, the advantage is decidedly with our own so far as the cultivation of ornamental trees and shrubs is concerned.

One could not justly base a criticism of continental landscape gardening on a visit of so short a duration as mine. For one thing, most of the places I saw are not an expression of the more recent phases of landscape art ; they represent the thoughts and modes of 100 to 200 years ago. But Versailles and its tradition, it would appear, has had a desolating effect on the gardens of Europe. Every petty monarch or prince seems to have felt it necessary to support his dignity by aping the methods of the great Louis, as far as his means allowed, and one result was often a Versailles on a small scale. About the time of the French Revolution more poetical and romantic ideas with regard to gardens began to prevail, and they found their expression in the so-called " English Garden " of the time. Marie Antoinette herself made one at Petit Trianon—a charming spot. But the " English Garden " was very frequently as extreme in one direction as is Versailles in another. The least approach to formality was tabooed, and the paths and promenades took very tortuous lines, often meaningless in so far as their curves and windings led to nothing in particular. With a century's tree-growth upon them, some of these " English Gardens " have in their way become as monotonous as Versailles.

### Brussels and Tervueren. June 2, 1908.

The chief object in visiting Brussels was to see the newly formed Arboretum at Tervueren. This has been planned by, and is under the control of Professor Bommer, conservator of the Botanic Garden at Brussels. The out-door department of the Brussels Botanic Garden does not offer many features of interest, and neither in position nor extent can it be described as worthy of the capital of Belgium. On the other hand the glasshouses are excellently managed—there is a very fine collection of rare plants, admirably cultivated. No doubt the new plantations at Tervueren are intended to relieve the Brussels Botanic Garden altogether of the attempt to grow a botanical collection of trees and shrubs. The best use to which it could be put would be to transform it into an ordinary town garden, and to transfer the out-door collections entirely to Tervueren.

The journey from Brussels to Tervueren is worth making, if only for the sake of inspecting the splendid plantations of beech, managed on scientific forestry principles, which border the track of the electric tramway for a part of the way. Before leaving Brussels a short detour was made to visit the charming Bois de la Cambre. This park is well worth seeing for its fine trees, especially beech, and for the pleasing and diversified prospects which it affords.

The village of Tervueren is situated in a pleasant, open and undulating country. It is a quaint and interesting place, and fills a place in history through having been for six or seven centuries a seat of the Dukes of Brabant. Remnants of the old ducal chateau still exist.

The Arboretum, which was only founded some six years ago, covers about 300 acres. The picturesque and undulating site it occupies is largely covered at the present time with young native woodland. It is planned on purely geographical lines, a definite area being devoted exclusively to the trees of one particular region. The two great primary divisions of the Old and the New World are divided and sub-divided into areas whose size has been determined by the extent and character of tree vegetation they are intended to accommodate. Thus we find the trees of the Rocky Mountains, those of the Mississippi basin, those of the Caucasus, those of Japan, and so on, collected into separate groups. Every region, in fact, on which a characteristic arboreal vegetation exists, hardy enough to succeed here, has its own allotted space. Most of the trees although still young, are thriving well. Some are planted in groups of a single species ; sometimes two or three species are planted in association. They are planted in clearings of the young native woodland, which is useful now in affording shelter, but which it is intended to gradually clear away as the exotic vegetation develops.

The Arboretum was given by the King of Belgium for its present purpose, to form a pleasant place of resort for the people of Brussels, and has been very skilfully planned so as to preserve and develop the beauty of its landscape. The charming valleys by which the site is intersected are left open, and serve the double purpose of affording pleasant and varied prospects, and giving convenient routes from one part to another. Some of the approaches to the Arboretum are planted with long avenues of purple beech, which, although still young, give singularly striking effects. The trunks of these trees are not pruned clean, but the side-shoots are trimmed back so as to form a kind of bushy column round the trunk reaching from the ground to the lower branches of the tree. The chief purpose of this system is to shield the young trunks from the effects of the Continental sunshine. Also, by increasing the leaf-surface of the tree, they augment its wood-producing capacity. When the trees have grown sufficiently to shade their own trunks, these side-shoots are removed. A well-kept and well-stocked nursery for trees makes a useful and interesting adjunct to the Arboretum. It should be added that it is intended eventually to supplement the collections of trees by shrubs and herbaceous plants from the same regions.

A geographical arrangement of trees is a favourite feature in the botanic gardens of the Continent. Even in small ones, where

there is not sufficient space for an arboretum planted according to botanical relationship, crowded groups of trees with a geographical affinity are to be found. Unless the planting is done on broad and spacious lines, it appears to me to have but a small educational value. But no reproach of that kind can be made against the Arboretum at Tervueren. It is planned on a generous scale, and if the original scheme is carried out, it should develop into the finest and most interesting thing of its kind in Europe.

### Boskoop (near Gouda in Holland). June 3.

In recent years no locality on the continent of Europe has come more prominently into the notice of the horticultural world than Boskoop. This little town is within easy reach of Rotterdam, the journey being made as far as Gouda by train, and thence by boat to Boskoop. The region is typically Dutch, the land being perfectly flat as far as the eye can reach, and cut up into long, rectangular areas by an elaborate system of canals. The level of the water in these canals can be altered at will by means of pumps and sluices. When conflicting interests are involved, the water level is decided on by a majority vote of the people concerned in each particular section. In June last it was from 1 to 1½ ft. below that of the land. The traffic of the nurseries passes over these waterways, plants, materials, etc., being taken from one place to another by means of boats. The soil is of a dark, peaty nature, and of so soft and springy a character that the vibrations caused by one person jumping on the ground can be felt by another several yards away. These conditions have proved to be extraordinarily favourable for the growth of many trees and shrubs, and Boskoop has, in consequence, become the centre of a remarkable colony of nurseries. I was told that over six hundred firms who make the cultivation of trees, shrubs, and other plants their business are established in this neighbourhood.

Whilst almost every species and variety of tree and shrub that is hardy in the climate appears to thrive here, Boskoop is particularly suitable for the cultivation of those finer-rooted plants which in the majority of gardens require rather special care and treatment. Thus, rhododendrons, azaleas, kalmias, and magnolias of the *conspicua* type thrive exceedingly well, as do conifers of various sorts, especially the firs and spruces. The silvery-leaved forms of *Picea pungens* make most striking pictures when grown in nursery masses, as one sees them here. Of the several forms seen, the finest is called *P. pungens*, var. *Kosteri pendula*. Japanese maples are grown in large quantities, also the Asiatic wistarias, flowering cherries, and roses. *Tilia dasystyla* (*T. euchlora*), the Caucasian lime, which is so promising as a tree for street planting, is abundant in these nurseries.

### Mr. Hesse's Nursery, Weener, Hanover. June 5.

It is a long and tedious journey from Rotterdam to Weener, which is situated near Leer in north-west Hanover, and there is but little of interest on the route. The flat, canalised lowlands of Holland give place as one travels northwards to another type of

country almost equally flat but much drier. It is here that one first encounters the immense plantations of Scotch pine which fill so much of the landscape as seen from the train all the way to Berlin, and then southwards to Dresden.

Mr. Hesse's nursery has long been known to us at Kew as one of unusual size and interest. It covers 100 hectares and some 250 people are employed in it. Admirably kept and managed, it is at the present time a remarkable testimony of what one man's business capacity and organising qualities can accomplish, for it is entirely the creation of its present owner. Mr. Hesse grows a large number of fine specimen trees which are kept, not to sell, but as permanent features of the nursery and as stock plants. Among them are many rare and interesting things. *Picea Breweriana*, for instance, is here, a single plant raised from seed 15 years ago. This plant and one at Kew are believed to be the only two trees of this species in Europe at the present time, except for the few plants which have been raised from them by means of grafts and cuttings. There is a singularly beautiful variety of the common spruce whose young shoots are creamy white ; it was raised here, and is called *Picea excelsa*, var. *argenteo-spica*. The new cork-barked fir from Arizona (*Abies lasiocarpa*, Hook., var. *arizonica*) is grown in large quantity. The Servian spruce (*Picea Omorica*) by its behaviour here, confirms the high opinion of its merits we had already formed at Kew. The rare Japanese *Abies Mariesii* has hitherto been so difficult to obtain that it was a surprise and pleasure to find it here in considerable numbers. But Mr. Hesse has always kept a keen look-out for new things. The West American larch (*Larix occidentalis*), for instance, about which hopes are entertained that it will make a substitute for the common larch in British woods, was introduced to this nursery and grown more than twenty years ago. It is evidently not so hardy as *L. europaea*, for it would not stand the winters at Weener. In connection with the question of hardiness in North Europe, it may be of interest to some readers of the *Kew Bulletin* to learn, on the authority of Mr. Hesse, that *Crataegus coccinea* (North American) and *C. sanguinea* (North Asiatic) are hardy in parts of Russia where the common thorn (*C. Oxyacantha*) will not live. It would occupy too much space to enumerate one-tenth of the interesting plants in the Weener nursery. There are enormous breadths of garden rhododendrons, many fine lilies and herbaceous plants. And as for the commoner forest trees, and trees used for street planting, they exist in hundreds of thousands.

### Herrenhausen, Hanover. June 6.

Leaving Weener on the evening of June 5, Bremen was reached the same night. The following morning, after a brief inspection of one of the town parks, which was found to contain many fine old trees, notably weeping ash, fastigiate oak, and some large Magnolias, the journey was resumed to Hanover. The point of interest in Hanover is Herrenhausen, an ancient seat of the Kings of Hanover. The place has a particular association with Kew because the last King of Hanover lived for some years in Hunter House, the building on Kew Green near the Main Entrance which afterwards became the Kew Herbarium. The private grounds in

which it stands are still sometimes spoken of as the "King of Hanover's Grounds." To botanists and horticulturists Herrenhausen is also interesting for the gardens that surround it, and especially the Botanic Garden.

The political differences which long existed between the Dukes of Cumberland and the Government of Prussia, and the consequent absence of the former from his home at Herrenhausen has no doubt led to the gardens there suffering considerable neglect. It was fortunate that for many years they were under the superintendence of Mr. Wendland, an enthusiastic botanist and gardener, and an *élève* of Kew.

The most striking object in the Botanic Garden is the Palm House. This lofty structure affords head room for the growth of many magnificent palms At one time the collection here exceeded in extent any other in Europe. In the grounds are many interesting trees and shrubs of unusual size. The curious Araliad from China, *Acanthopanax sessiliflorum*, is represented by a bush 12 ft. high and 21 ft. across. *Pyrus floribunda* is a tree 35 ft. high, 42 ft. through, and has a trunk 4 ft. 3 in. in girth. *Viburnum plicatum*, a bush 8 ft. high and 12 ft. through, with every twig bearing its large pure white truss, made a dazzling picture. Many finely developed oaks are here; amongst them, *Quercus heterophylla*, with a trunk 10 ft. 6 in. in girth; *Q. coccinea*, 8 ft. 9 in.; *Q. imbricaria*, 9 ft. 2 in.; and *Q. Toza pendula*, 4 ft. 5 in. The Constantinople nut (*Corylus Colurna*) made a lofty pyramid 45 ft. through at the base, with its lower branches reaching to the ground. Perhaps the most beautiful of all the deciduous trees in this part of Germany are *Acer dasycarpum* and its variety *laciniata*. Both of them grow into large trees of a peculiarly elegant mode of growth, the ultimate branches being long and pendent, and of a pretty, glaucous hue beneath the leaf. Other good maples are *A. saccharinum*, 6 ft. 9 in., and *A. monspessulanum*, 5 ft. 5 in. in girth of trunk. The Kentucky coffee tree (*Gymnocladus canadensis*), of which there are but few really big specimens in Britain, is here about 70 feet high, with a trunk girthing 7 ft. 4 in. The red chestnut (*Æsculus carnea*) is, in size, more like the common horse chestnut in England. *Betula nigra*, always distinct for its dark rugged bark, is 7 ft. 6 in. in girth. The interesting Japanese tree, *Cercidophyllum japonicum*, so disappointing in Kew through its liability to injury by spring frosts, thrives particularly well in Central Europe. Here in Herrenhausen, a graceful young tree, 20 ft. high, with a clean trunk 1 ft. 8 in. in girth, was in perfect health, and growing rapidly. Among other trees of more than ordinary merit were *Sophora japonica*, girthing 10½ ft.; *Crataegus Crus-Galli*, var. *prunifolia*, 6 ft. 9 in.; *Pterocarya caucasica*, with rough scaling bark, 10 ft.; *Nyssa aquatica*, 4 ft. 4 in.; *Magnolia cordata*, 35 ft. high, 3 ft. 1 in. in girth; and *Tilia petiolaris*, 9 ft. 2 in. in girth.

One of the most famous features of Herrenhausen is a double avenue of lime trees leading from the house to the mausoleum. Loudon wrote of these "alleys" more than seventy years ago as having "long been celebrated." They have recently been headed back almost to the trunks—a necessary operation, no doubt, on account of their age.

There yet remains to be noticed the formal garden which fills a huge area in front of the house, and provides such a vivid contrast to the Botanic Garden we have just left with its fine trees, lawns, and shady walks. This formal garden is a striking illustration of the numerous gardens on the Continent whose designers drew their inspiration from Versailles. It is situated on a perfectly flat piece of ground, and consists chiefly of a series of avenues and straight walks radiating from circular open spaces. The morning of June 6, like the previous night, had been rainy, and many of the walks were a morass of mud two to three inches deep. A large part of the workmen's time must be taken up with such purely mechanical work as clipping the interminable hedges and raking over the walks. A sheet of water of considerable size and several circular basins give some interest to the place, but little gardening of a genuine nature is done, and few flowers are to be seen. Statuary, however, is abundant. The triangular spaces formed by the radiating walks are frequently enclosed by high clipped hedges of hornbeam, and these enclosures have sometimes been made into little orchards—a quaint and old-world feature. But, on the whole, this huge formal garden is depressing. An indefinable air of sadness pervades the place, and as one traverses the maze of walks and avenues in search of some pleasing feature, one keeps on asking oneself the question, "What is the good of it all?" without ever finding a satisfactory answer.

## Berlin. June 7 to June 10.

The stranger interested in trees seeks out, on his first arrival at Berlin, the famous Unter den Linden. As a street, with the magnificent Brandenburg Gate at one end, it ranks as one of the finest in Europe. But as an example of arboriculture it is disappointing. The limes are healthy but small, and very much of the type to be seen in hundreds of streets in the suburbs of London. They are planted to form an avenue along the middle of the street, leaving a space for carriages and other traffic at the sides.

Through the Brandenburg Gate one reaches the Thier Garten. This is an area of perhaps 200 acres, largely covered with wood. Whilst the walks by which it is intersected afford agreeable and shady promenades for the people of Berlin in summer, the whole is of a monotonous character, and the trees themselves present no striking features. They are growing too thickly to develop into fine individual specimens, but not thickly enough to represent good forest conditions. It cannot be compared with the delightful Bois de la Cambre on the outskirts of Brussels.

My chief object in visiting Berlin was to see the national Botanic Garden at Dahlem. This is a new garden, founded only some five or six years ago, and it is new not only in point of age, but also in ideas. Whilst there is not a little which invites criticism, there is much that claims one's admiration, and much that is full of suggestion. No attempt, however, will be made to describe it at the present time, as the subject is too important a one to be dismissed in a few paragraphs and it has recently been well and fully dealt with in the "Gardeners' Chronicle."

The open spaces of Berlin are too often planted with that same lack of inspiration with which we are so familiar in this country. But occasionally one sees striking and pleasing effects. There is a fine series of thorns in the König Platz, and one sees admirable specimens of the Rouen lilac (*Syringa chinensis*) grown as standards. In early June a very attractive display was made by the Diervillas. A favourite form of garden decoration is the training of Virginia creeper and other climbers in festoons reaching from the trunk of one tree to another.

No one interested in landscape work should visit Berlin without seeing the waterfall in the Victoria Park. This park is situated on the sides of a conical hill which is the highest point for some distance round, and affords an extensive view over Berlin. The summit of the hill is crowned by a monument recalling the battles of the last Napoleonic campaigns, 1813–5. But the great feature of the park is an artificial waterfall which courses down one side of the hill. It is modelled on a steep mountain gorge, and there is nothing skimpy or makeshift in either the design or its execution. The water, which is supplied in splendid profusion, rushes down the gorge over immense boulders arranged in perfect imitation of nature, and the sides are overhung with a profuse and picturesque vegetation. The whole thing, however, which is the work of a genius, is marred by one defect. As one stands at the bottom of the hill looking up the gorge through which the masses of water are tumbling down, the eye finally rests on the black, ugly, Gothic monument at the top recalling the defeats of Napoleon. This is sufficient to destroy all *vraisemblance*, and it is curious that the authorities who manage this park do not block out the sight of the monument from this particular point, as could easily be done by planting some quick-growing tree at the top of the gorge.

## Mr. L. Späth's Nursery. June 9.

There are few firms of nurserymen which can boast of as long and successful a career as that which has its present head in Mr. Ludwig Späth, of Baumschulenweg near Berlin. The founder of the firm, Christoph Späth, was born in 1696, and the business was in his hands from 1720 to 1746. He was succeeded by Carl Frederick Späth—1746 to 1782; then by another Carl Frederick—1782 to 1831. Johann Carl Ludwig Späth carried on the business from 1831 to 1863, and since then it has been in the hands of the present owner. The firm of Späth may, indeed, be regarded as a national asset of Germany. Some idea of the reputation it holds among leading men may be gathered from the fact that both Bismarck and Moltke honoured the nursery by planting memorial trees therein with their own hands.

The nursery covers at the present time 1,300 morgen (about 820 acres), and is being increased almost yearly. An enormous business is done all over Northern and Central Europe in trees and shrubs for every purpose. Whilst, to meet demands of this nature, enormous areas of the commoner trees such as planes, limes and various maples are grown, the nursery has besides been long noted for the large collections it contains. There are few nurseries in the world which contain so large and varied a stock,

Mr. Späth maintains near his dwelling-house a large arboretum, which is private garden as well. Here is cultivated in permanence a very extensive standard collection, and many of the trees have developed into notable examples of their kind. It should be mentioned, as showing the spirit in which the business is conducted, that a skilled botanist is attached to the firm, whose duty it is to see that everything in the nursery is correctly named.

Perhaps the most beautiful shrub in flower on June 9 was *Lonicera Korolkowii*, a comparatively new species from Turkestan. Bushes of this, 8 ft. high, were covered with exquisite pale pink flowers, displayed in most attractive fashion by reason of the free graceful habit of the shrub. Another very striking shrub was the pubescent variety of *Chionanthus virginica*, 12 ft. high, and loaded with its thyrses of white, narrow-petalled flowers. *Cornus Späthii*, a yellow-leaved variety of *C. alba*, usually regarded as the best of all yellow-leaved shrubs, originated in this nursery. The interesting fact was learnt that it first appeared as a sport from a stock plant on which had been grafted a variegated Cornus, the graft itself having died. *Rhododendron Ungerni*, a rare plant allied and very similar to *R. Smirnowi*, is here; it is distinguishable by the cuspidate apex of the leaf. *Quercus pontica*, a very handsome large-leaved oak from Lazistan, I was glad to see, also the true *Pterocarya rhoifolia*. An interesting fir is *Abies insignis*, a presumed hybrid between *A. Pinsapo* and *A. Nordmanniana*. The nursery is very rich in coloured-leaved and other varieties of maple; amongst them *Acer platanoides*, var. *Walderseei*, a Norway maple, whose leaves are so densely speckled with white dots as to give them a delicate grey appearance, was one of the most noticeable in June. A splendid tree of the typical "Box elder" (*Acer Negundo*) is 60 ft. high and 6 ft. 6 in. in girth of trunk. *Populus berolinensis*, a useful semi-fastigiate tree is here in quantity; it is an interesting hybrid between *P. laurifolia* and the Lombardy poplar. A notable culture in this nursery is the big standard rose. A plant of one variety "Madame Sancy de Parabère," loaded with flowers, measured 10 ft. high by 8 ft. through.

## Sans Souci. June 10.

The Royal Gardens attached to the old chateau of Sans Souci are certainly as interesting and beautiful as any I saw, either in Germany or Austria Although a considerable space is given up to purely formal arrangements, the Versailles influence has not, as at Schönbrunn and Herrenhausen, been allowed to overlay the whole place. The chateau itself stands on an eminence, and is approached by a long and imposing series of flights of steps. The hillside has been terraced, and the supporting walls of the terraces are covered with glass, and are used for the cultivation of the less hardy fruits. The terraces themselves are also utilised for the cultivation of fruit trees and vegetables.

The level ground at the base of the hill is furnished with a varied and very interesting sylvan growth. Many of the trees are finely developed. *Tilia argentea*, for instance, is at least 80 ft. high, and there are a pair of fine maidenhair trees (*Ginkgo biloba*). *Cercidophyllum japonicum* is 25 ft. high—a picture of health and

elegance. A striking and somewhat unusual effect was made by planting purple beech and the variegated *Acer Negundo* so close together that the foliage of the two trees commingled. The restrictions compelling visitors to keep to the paths are, as in other German public gardens, strictly enforced and prevent a close inspection of the trees and shrubs.

The purely formal arrangements at Sans Souci are often very pleasing. They do not depress one by their extent and dullness as at Herrenhausen. In one place there is a small garden of azaleas disposed in formal beds cut out on the lawn and surrounded by large clipped yews ; this must be a very pleasant spot when the azaleas are in blossom. In another place a circular flower garden of "geometric" beds is surrounded by a raised terrace, and the terrace is traversed by a plashed alley of hornbeams. In the "walls" of the alley, windows are left through which views of the flower garden, with its central statue of Apollo are obtained. The sloping banks of the terrace are clothed with a luxuriant growth of ferns. These and other features of a similar nature are dispersed amidst the sylvan growth of the place. Although they are somewhat foreign to the gardening taste which has prevailed in England for a generation or more, they have a certain quaintness and charm. Like so many gardens of its period and character, Sans Souci is liberally besprinkled with statues and grottoes, and there are several water-basins and other forms of masonry. One leaves Sans Souci with a desire to see it again.

The distance between the gardens of Sans Souci and the newer palace of Potsdam is filled with woodland of somewhat the same character as the Thier Garten outside the Brandenburg Gate. Owing to the Imperial Family being in residence, it was not possible to obtain a close view of the Schloss and its immediate surroundings.

### Dresden Botanic Garden. June 11.

Few cities give the stranger a more pleasing first impression than Dresden, and this feeling is not, as so frequently happens on the Continent, dispelled when the Botanic Garden of the place is entered. The Botanic Garden of Dresden, though not large, is admirably managed, and is a worthy accompaniment to the fine streets, churches, public buildings, and galleries of the city.

The trees and shrubs I found particularly interesting, the collection being varied and extensive, and many of the individual specimens finely developed. It is not often one meets with so many uncommon trees and shrubs in so small a space, and in so characteristic a condition. The garden is not large enough to grow everything, so, very wisely, preference is given to the rarer and more beautiful species. On the other hand valuable space is given up to a geographical arrangement. This, as has already been noted, is a popular arrangement in Continental gardens. Often the hardy trees and shrubs are augmented by a huddled mass of plants in pots representing the flora of the Cape, or Australia, or the Canary Islands. I was never able to perceive its value unless done on a grand scale, as it is at Tervueren, near Brussels. Where there is insufficient room for a complete collection arranged

systematically, it seems to be a waste of space to duplicate such trees as there is room for under a geographical arrangement. It seems absurd to expect to reproduce the characteristic features of (say) the Californian sylva on a plot not many yards square in the middle of Europe. And for purposes of comparison and the solution of problems of identity, it is surely more convenient to have the representatives of a genus in close proximity rather than the representatives of a country generally.

Magnolias thrive exceedingly well at Dresden. A plant of *M. stellata* 10 ft. high and 15 ft. through must be a wonderful picture when in flower. There is also a very handsome specimen of the comparatively new and uncommon *M. hypoleuca;* it is 17 ft. high, the branches rather erect, and the habit pyramidal. Of the large trees, *Populus trichocarpa* was perhaps most noteworthy; this species is allied to the balsam poplar, but comes from Western North America. Although not very long known in England, it is already 70 to 80 ft. high in this garden, and its trunk girths 5 ft. 10 in. *Quercus bicolor*, one of the American white oaks which do not thrive well in England, is here 50 ft. high, very healthy, with a trunk 3 ft. 4 in. in girth. Other interesting oaks are the American *Q. stellata* (or *Q. obtusiloba*), 25 ft. high, and *Q. pontica*. *Larix occidentalis* is 25 ft. high, but conifers generally are not good. Among the shrubs, *Fendlera rupicola*, which is not really hardy at Kew, is 6 ft. high at Dresden; *Cornus alternifolia*, a very elegant and distinct species is 15 ft. high and 12 ft. through; *Styrax japonica* 12 ft. high, flowering well; and *Menziesia globularis* 5 ft. high. Three dwarf shrubs were very charming: *Loiseleuria procumbens*, *Epigaea repens*, and *Oxycoccus macrocarpus*, all growing in soft spongy peat in full sunshine.

There is a small well-furnished rockery on which many Alpine plants are thriving admirably, and the herbaceous plants generally are good.

### Grosse Garten, Dresden. June 11.

A short tram ride from the Botanic Garden will take the visitor to the Grosse Garten, which will well repay the journey. This demesne surrounds an ancient and beautiful house, once a royal residence, but now a museum. A considerable portion of the grounds are covered with beautiful woodland, intersected by straight avenues and winding paths. But near the house is a flower garden, formally laid out, and containing on its borders some fine trees. There is a *Gymnocladus canadensis*, not quite so fine as the one at Herrenhausen, but girthing 6 ft. 3 in.; there is one of the finest specimens of *Gleditschia triacanthos* in Germany —a tree with an enormous spreading head of elegant foliage, supported by a trunk over 7 ft. in circumference; and there are a weeping copper beech 40 ft. high, a fine golden oak (*Quercus pedunculata*, var. *Concordia*) nearly as tall, and a *Tilia cordata* branching close to the ground where the trunk is about 8 ft. through. In a shady opening into the woods was a most pleasing arrangement of rhododendrons, a spot which may in time suggest the Rhododendron dell at Kew. A good use here, as in Berlin, is made of the Rouen lilac grown as standards. They make rounded

bushy heads 8 or 9 ft. through, supported on stems 4 to 5 ft. high and 20 in. or so in girth. Returning towards the town by another route, one may traverse the banks of the Carola see, a charming lake with undulating, curving banks, and a prettily disposed marginal vegetation, amongst which the silvery-leaved *Elaeagnus orientalis* was a most telling feature in June, surpassing any willow in whiteness.

The journey on to Prague was taken in the evening.

### Prague. June 12.

There is not much of unusual interest to the botanist and connoisseur of trees in Prague, but before going on to Vienna I paid a visit to the chief open space of the city, the Karls Platz. The grounds here are very pleasant, with lawn and trees disposed informally. Although considerably south of Berlin the trees used are the same as those common in the gardens of North Germany and Britain, and planters rely on such things as oaks, *Ailanthus*, black walnut, elms, *Robinia* and the like. To the foreigner, the chief object of interest in the Karls Platz is a statue of Benedict Roezl, the famous plant-collecter in Mexico and Tropical South America. He was born in 1824, and died at Prague in 1885. He is here vigorously portrayed in collector's costume, examining an orchid flower. One would search in vain the public gardens and open spaces of this country for a statue of any plant collector. Yet it is easy to recall the names of at least half-a-dozen men—some of them Kew men—who have as great a claim to the gratitude and remembrance of posterity as Benedict Roezl.

### Vienna Botanic Garden. June 13.

The Botanic Garden of Vienna, which is really an adjunct to the University, is now deeply buried in streets and houses. Although cramped for room like so many of its class, it contains many features of interest. There are two fine female specimens of the maidenhair tree with the characteristic pendulous branches. Near the entrance from the Renneweg are a fine *Ulmus glabra* and a magnificent *Platanus acerifolia*. The garden also contains two other notable planes—the true *P. orientalis* and *P. orientalis*, var. *insularis*, the latter with very deeply-lobed leaves. The Kentucky coffee tree (*Gymnocladus canadensis*), which I found so splendidly developed in many other gardens of Central Europe, is represented here by several good trees. The true *Gleditschia caspica* of Desfontaine, a tree with large oblong leaflets, and quite distinct from the form of *G. triacanthos* frequently found under that name, is here a low-branching unarmed tree, with a trunk nearly 8 ft. in girth at the base.

Many of the trees in the Vienna gardens showed the influence of a hot summer climate by their fine development, which was not so apparent at Berlin or even as far south as Prague. Thus, *Cladrastis tinctoria* (of which there is a good specimen) had flowered with great freedom, which at Kew happens scarcely once in a decade. *Pterocarya caucasica*, a large spreading tree with

numerous trunks, made a picture of great beauty, every branch being hung with the slender graceful racemes, about a foot in length. *Paulownia imperialis*, too, showed that it revelled in the heat of a Viennese summer ; one specimen has a trunk 7 ft. 6 in. in girth. *Cydonia sinensis*, which at Kew requires to be grown against a wall to succeed really well, is, in this garden, a tree 15 ft. high, with a striking trunk, the bark of which peels off like that of a plane. *Vitex Agnus-Castus* makes a bush 10 ft. high and 15 feet through. *Celtis Tournefortii*, a tree rare in England, with rather grey or glaucous foliage, cordate, and coarsely toothed, was noticeable for its hornbeam-like trunk. I was interested to see for the first time in flower the true *Schizophragma hydrangeoides* ; this is the Japanese creeper for which *Hydrangea scandens* is so often made to do duty.

An interesting feature of the garden is a series of small plots devoted to common and uncommon economic plants, vegetables, medicinal herbs, cereals, etc. This has a distinct educational value. On the whole the outdoor department of the Botanic Garden at Vienna is ably managed, considering the disadvantages as regards locality and want of space that have to be contended with. A rock garden of a somewhat puerile character and the usual needless geographical groups are the only things open to criticism.

### Schönbrunn. June 14.

The Imperial residence of Schönbrunn and the famous gardens attached to it are about three miles from the centre of Vienna, and easily reached by electric tram. The influence of Le Notre and his *chef d'œuvre* at Versailles, which is manifest in so many large gardens of the Continent, is nowhere more in evidence than at Schönbrunn. Originally designed by Fischer von Erlach at the end of the 17th century, the main features of the gardens have apparently been but little altered since. Immediately in front of the Palace is a flat, open parterre extending to the base of a hill ; the slopes of this hill have been partly terraced, and its summit is crowned by the conspicuous colonnade called the "Gloriette." The parterre is occupied by beds cut out on the turf, and filled with the usual summer bedding plants—pelargoniums, tuberous begonias and the like.

The chief features of Schönbrunn are its long, straight walks and avenues bordered by clipped hedges. Some of these hedges are 30 to 50 ft. high, and must represent an enormous expenditure in labour. The trees in commonest use are the field maple (*Acer campestre*) and hornbeam, and, judging by the size of the trunks of many of those that border the parterre, they must date back to Fischer's time. They are really big trees, with one side converted into a perpendicular wall of verdure by persistent pruning. Some of them show signs of rebellion, and a good many holes are appearing in these walls. Thus, the effect, which is imposing to the first view, is spoilt by a closer examination. Of gardening in the true sense there is but little.

Among the architectural features of Schönbrunn, besides the Palace itself, the most striking is the "Gloriette," which, situated on a hill nearly 800 ft. high, gives a fine view of Vienna and the

surrounding country. The Neptune basin at the base of the hill is a large and ornamental tank with a fountain at each end and a fine group of statuary in the centre—Neptune with Tritons and sea-horses. There are also some elaborate Roman ruins (artificial), and a lofty obelisk terminating one of the avenues and built on a kind of rockwork in which are "planted" some Agaves, palms, etc., done in metal! A large portion of the grounds at Schönbrunn is thickly wooded. In the lower-lying areas they form part of the garden design and are trimmed more or less, but on the hillsides east and west of the "Gloriette" are some fine natural woods in which the prevailing oak is a form of *Quercus sessiliflora* with very rugged bark. The Schönbrunn gardens are open to the public every day, and these shady portions are favourite resorts of the Viennese. On Sunday, June 14, I found the place thronged with people soon after 9 a.m.

### Schönbrunn Botanic Garden. June 14.

Whilst the garden proper of Schönbrunn is decidedly worth visiting as representing a really extraordinary example of its particular style, its monotony soon becomes wearisome. Some of its walks are ¾ to 1 mile long—deserts of gravel. But on its western side there is a narrow strip of ground, called the Botanic Garden, which is full of interest. This garden is said to have been instituted by the Emperor Francis I. in 1753. It possesses, indeed, the dignity of age, and its magnificent trees, green lawns, and winding walks are an inviting contrast to the arid formalities close by. There is a fine Palm house of a design somewhat similar to that of Kew, but with more architectural ornamentation; on the day of my visit 1 krone (10d.) was charged for admission. The collection of Australian and other greenhouse plants is very extensive.

To the English visitor there is, perhaps, no tree so striking in the neighbourhood of Vienna as *Pterocarya caucasica*; in this garden there was a very fine specimen clothed with innumerable elegant pendent racemes. A striking tree also is a small-leaved form of *Ulmus campestris*, here called *U. angustifolia*, with a handsome well-balanced head supported on a trunk 13½ ft. in girth, and very elegant with its slender feathery twigs. A specimen of the American white ash (*Fraxinus americana*) has a trunk 7 ft. in circumference. I was struck by the fine development of *Corylus Colurna* at Herrenhausen, but the tree there is surpassed by those at Schönbrunn. One I measured has a trunk girthing 10 ft. 3 in. at one foot from the ground where it divides into five great limbs. This tree is probably 65 ft. high. *Sophora japonica* is represented by a splendid old specimen; its trunk branches low and not far from the ground level measures 18 ft. in girth; and the branches, some of which rest on the ground and have taken root, cover a space 105 ft. across. This tree appeared to be from 70 to 80 ft. high. A handsome tree of *Gleditschia caspica* is 40 ft. high, and the cut-leaved variety of the Norway maple (*Acer platanoides*, var. *laciniatum*) is here as elegant in its foliage as some forms of *Acer japonicum*. *Prunus triloba fl. pl.* is highly prized in England for its masses of large rose-tinted double flowers, but I have not seen so fine an example anywhere as one in this garden

at Schönbrunn, which was grafted on a standard and had a large bushy head 10 ft. high and a main stem more than 1 ft. in girth. The use of flowering shrubs grown as big standards is much more common on the Continent than with us. These are but a few of the more notable trees I saw in this pleasant corner of Schönbrunn.

### Other Parks and Gardens of Vienna.

The remainder of my time in Vienna was spent in seeing various gardens and parks about the city; of these the three briefly noted below were the most important. The Stadt park is not large, but is well designed and managed. It contains a huge spreading specimen of *Pterocarya caucasica*, the finest among the many fine ones I saw in this neighbourhood. There are also some good fastigiate oaks, trees of a Lombardy poplar-like growth, not sufficiently appreciated in Great Britain. *Elaeagnus orientalis*, a silvery-leaved tree much planted in Central Europe, was very good here; one tree had a trunk 4 ft. 8 in. in girth. This small tree (sometimes a shrub) is not much planted in England, but, no doubt, the whiteness of the leaf is more pronounced under the Continental sun than beneath our duller skies. In Germany and Austria its effect is something like that of the whitest form of *Salix alba*, but even more intensely silvery.

The Prater, an island in the Danube, is the largest public park of Vienna, and a popular pleasure resort of the Viennese. Through it runs a straight avenue—the Haupt-Allee—$2\frac{3}{4}$ miles in length, bordered largely by horse chestnut trees. At each side of this noble avenue—the Rotten Row of Vienna—are woodland and grassland. Some of the former is interesting as being the remnants of an ancient natural forest, consisting of oaks and other trees. It was a favourite hunting-ground of the Austrian Emperors of the 16th and 17th centuries.

The Belvedere gardens are close to the Botanic Garden of the University. They consist of a long rectangular area, sloping upwards from the Renneweg to the Belvedere Chateau. They are laid out in a purely formal style, and the slope is partially terraced. The chief features of interest here are the well-kept clipped hedges of field maple 12 ft. high; clipped yews of sugar-loaf shape; and low, square box hedges. There are also circular basins of water, ornamented with groups of statuary. Of naturally grown trees there were none, and but few flowers. On the south side of the chateau (a handsome structure built about 200 years ago for the Prince Eugene of Savoy) are other gardens, but they were not open to the public.

### Ischl. June 16 and 17.

This beautiful little town, situated among the North Austrian Alps, and now well known as the summer residence of the Emperor of Austria, and a fashionable bathing place, is the centre of a great forest region owned and controlled by the Austrian Government. It was to see these forests, and gain such information as to their management as a two days' sojourn would permit, that a visit was made to Ischl. The whole district is under the direction of a "forest-master"—a position of some importance

and authority. Through the good offices of Professor von Lorenz of Vienna, the "forest-master" kindly furnished me with a guide for the two excursions I made into the forests.

So far as one is able to judge from the railways, the forests of the great plain of Hanover and Prussia are chiefly made up of the Scotch pine (*Pinus sylvestris*). Turning south from Berlin to Dresden the same tree predominates until Dresden is reached. But thence to Prague and Vienna, the spruce (*Picea excelsa*) and the silver fir (*Abies pectinata*) begin to prevail, and here at Ischl the Scotch pine plays but an unimportant part. The two trees of greatest importance are the common spruce and silver fir; then comes the larch, whose timber is more valued than that of either. No species of broad-leaved tree is of much importance in these mountain forests with the exception of the beech, of which some fine areas exist at the lower elevations. The Emperor has hunting rights, and some of the inhabitants of Ischl have certain heritable privileges in regard to cutting timber for their own use. With these exceptions the forests are entirely utilised and preserved for purposes of State revenue.

The forests are all natural, and they are replenished almost wholly by natural means. The timber is appropriated sometimes piecemeal, but sometimes whole sections are cleared at once. The ordinary forest is dense enough to prevent the growth of young seedling trees, and therefore very few of sizes intermediate between the big timber trees and tiny seedlings are to be seen. When a section is fit for cutting, trees are felled to admit sufficient air and light for the natural young forest growth to establish itself, which is always there waiting for its opportunity. But the section is not entirely cleared of old trees until this young forest growth is at least 3 ft. high. When a section is cleared entirely it is planted up again in the ordinary way, and the useful plan is adopted of establishing a small nursery of sufficient young trees for the purpose in proximity to the clearing.

But, on the whole, these forests are in no sense "man-made." They are regarded as natural reservoirs of timber from which the aim is to draw off every year a year's natural increment. The age of the trees fit to be cut varies according to the fertility of the ground and the elevation at which they grow, but I was told that the finer trees are 200 years old. Some such trees (silver firs) I measured were 130 ft. long and 10 ft. in girth. The timber most valued is the larch, which grows on the higher elevations; after that comes the spruce, and, thirdly, the silver fir. All three are genuine natives of the district. Besides supplying the local demand for fuel and building these timbers are largely exported into Germany.

Most of these trees grow on the shelves and steep slopes of the mountain sides, quite inaccessible to ordinary means of traffic. The transference of the timber from the high elevations to the valleys is effected by means of "timber-slides." A timber-slide is a sort of trough, one metre wide, extending in two or three sections from a depôt on the heights to another in the valley, where the timber can be put on bullock wagons and thence on rail. The sides are formed of whole trunks of silver fir laid end to end, usually singly. But in places where the "slide" takes a

curve the outer side of the curve has two tree-trunks laid one above the other to counteract the centrifugal tendency of the timber rushing down the "slide." The track, or bottom, of the slide is laid with crosspieces of beech, which are about 2 ft. 6 in. apart. Where the "slide" takes a curve the track is sloped inwards on the same principle, and for the same reason, as is a railway track in similar circumstances. The fall of the "slide" follows pretty much the face of the mountain side, but occasionally it has to be bridged over gorges and watercourses, and sometimes "cuttings" have to be made through ridges. The "slide" I inspected was in some places only 20 per cent. out of the perpendicular—equal to an angle of 72 degrees. In such places the enormous trunks fly down with a tremendous velocity. In other places the fall of one section of the slide is so gentle that it is only used in wet weather when the track is kept slippery by rain. Thus are these enormous tree trunks transferred from the mountain plateau to the valleys. They are dispatched with the thick end of the trunk first, and this is slightly sharpened or rounded to reduce the risk of its being impeded by the sides of the track. And for the same reason the trunks are, of course, carefully trimmed before they are sent off. This timber-slide cost 40,000 kronen (about £1,650) to construct without counting the value of the timber used, which was mostly on the spot.

The woodmen—an admirable type—live in these forests all the year round, only going home to their villages from Saturday night until Monday morning. Through the week they live, a dozen or so together, in commodious wooden houses built of logs of timber. They sleep on broad shelves liberally supplied with straw, and each man has his private locker. During the week their food consists almost entirely of the grey rye bread of the district. Their costume is a short jacket, a serviceable pair of leather breeches cut to well above the knee, and leggings not reaching to the knee, which is thus left bare.

### The English Garden at Munich. June 19.

The "English Garden" at Munich is one of the most noted public gardens in Germany; at one time it was (and, perhaps, now is) the largest—containing about 500 acres. The chief essential of these so-called English Gardens of the Continent appears to be that they must not contain a straight line of any sort. No doubt they represented a very necessary revulsion against the school of Le Notre, but they erred as much in another direction. This English Garden at Munich was designed in 1789 by a famous man of his time—Louis Sckell—and appears to have long been considered an admirable piece of work. No doubt it affords the people of Munich an abundance of shady walks and promenades, but of genuine landscape effects there are few. It is well supplied with water by means of a stream which flows through it, and in one place this is very happily used to make a waterfall. It also feeds a lake of considerable size, which gives some pretty prospects and a welcome distance of view. The great need of this "garden" is one or two broad straight avenues to give some sense of space and distance, for the place is heavily wooded, and, except for the lake and a few stretches of hay-land, one's outlook is very

restricted. The predominant impression with which one leaves the English Garden at Munich is that it is a labyrinth of walks and roads hemmed in by tall slender trees, which ought long ago to have been thinned, and that it goes a long way to justify the sarcasm levelled by a Frenchman at the path-making of so-called "English Gardens" in general: "You intoxicate your gardener, and then mark out his tracks."

### The Nursery of Messrs. Lemoine, Nancy. June 20.

In travelling from Munich to Paris, the train passes through Nancy, and advantage of this was taken to visit the renowned nursery of Messrs. Lemoine et Fils. For many years this nursery has been famous for a remarkable series of hybrid plants produced in it. M. Lemoine the elder, now an octagenarian, but still busy and active, has a wonderful faculty—it really amounts to genius—for estimating and bringing out the qualities of a plant for breeding purposes. The acme of success in hybridising is to unite in the progeny of two species the good qualities of both, and to eliminate their undesirableness. No one living has achieved more in this direction than M. Lemoine. Two instances may be given: The Begonia "Gloire de Lorraine" gave to greenhouses a new and most useful plant of beauty and distinction; and *Philadelphus Lemoinei* was the first of a beautiful race of hardy shrubs quite distinct from anything we had before. A man's fame might securely rest on these two plants alone, but a great work also has been done in this nursery among lilacs, deutzias, clematis, gladioli, and many more.

Messrs. Lemoine also make a speciality of new and rare plants, both hardy and tender. A visit paid to this nursery, therefore, is full of interest and instruction, especially to anyone on the look-out for new and out-of-the-way plants. A mere list of such plants would be too long to give here, and many of the new hybrids I saw are not yet put in commerce or even named.

### Verrières-le-Buisson. June 22.

Verrières is famous as the central establishment of the great firm of Vilmorin-Andrieux et Cie., which dates back to 1746. It is also the home of the head of the firm, M. Philippe L. de Vilmorin, and its chief interest to me was in the fine collection of trees which grow in the large garden attached to the house. The property here, originally a French park laid out by Le Notre, was purchased by the then head of the firm in 1815, and several of the fine trees which now ornament its lawns were planted between 1815 and 1820. Many others are interesting as belonging to the first importations of their kind ever made into France. The garden is a charming example of its particular style—a style the very antithesis of that of Le Notre which it displaced. Smooth and gently undulating lawns are bordered by the fine trees, now a century old, and there are winding shady walks. One of the last features added to the garden is a beautiful rock garden made by the present proprietor. The firm of Vilmorin-Andrieux are the greatest seed merchants in the world, and do their work on a grand scale. Attached to Verrières is a large laboratory, in charge of a chemist, and also an extensive museum.

In some respects the two most interesting trees at Verrières are hybrids: *Juglans Vilmoriniana* and *Abies Vilmorini*. The first of these is of unrecorded origin, but is certainly a hybrid between the common and the black walnuts. It was planted in 1816, and is now a splendid tree over 90 ft. high. Its finely-shaped trunk is 10 ft. 2 in. in girth. The hybrid fir is of even greater interest. The cross was made here in 1867 by the late M. Henri de Vilmorin, between *A. cephalonica* and *A. Pinsapo*, and from the solitary seed produced, this tree, now 50 ft. high, was raised. Both in foliage and in habit the tree resembles *A. Pinsapo* (the seed-bearer) but its cones are more like those of *A. cephalonica*. These cones are produced abundantly, and carry fertile seed from which young trees have been raised; some of these seedlings more closely resemble the male parent in foliage. So far as is generally known this is the only hybrid conifer ever raised artificially. There is a tree of the rare *Larix occidentalis* about the size of the Kew specimens; like them, it produces an abundance of cones, none of which ever contain any fertile seed. This may be due to the comparative juvenility of the trees, but it is not favourable to the hopes entertained in regard to this tree that it may eventually fill to some extent the place now occupied by the common larch in English forestry.

One of the finest examples of *Pseudolarix Fortunei* in France is 33 ft. high and 3 ft. in girth of trunk. Two of the noblest trees of the garden are specimens of Corsican pine (*Pinus Laricio*); they are about 90 ft. high with smooth, erect, columnar trunks. Two large cedars of Lebanon do much to give this garden the air of distinction which it enjoys. A tree I had not seen before was a fastigiate variety of the white mulberry. Of some good oaks the best are *Quercus lanuginosa*, 70 ft. high; *Q. heterophylla* (carrying mistletoe) 73 ft. high; *Q. bicolor*, 5 ft. 4 in. in girth of trunk; and *Q. palustris*, 70 ft. high and 6 ft. 6 in. in girth. Besides all these, the garden contains many rare and beautiful shrubs and herbaceous plants.

### Les Barres. June 23 and 24.

To anyone interested in new and rare shrubs the most interesting place on the Continent at the present time is the fruticetum in process of formation by M. Maurice L. de Vilmorin at Les Barres. M. de Vilmorin has been in close relationship with travellers, chiefly missionaries, in China for many years past, and having received from them seeds of many species previously unknown in Europe, he has been able to get together a collection quite unique in the richness of its Chinese representatives. Over sixty years ago the grandfather of the present proprietor planted large areas of trees at Les Barres under forest conditions, with a view to testing their value in French forestry. These plantations, which consist of a considerable variety of both Old and New World trees, planted in large blocks (*massifs*) of a single species or variety, are now of considerable interest and value. They have been acquired by the French State, and Les Barres has become an important educational centre as regards French forestry. A botanical collection of trees has also been established in connection with the forestry school, and to this M. de Vilmorin's magnificent

collection of shrubs will form a valuable adjunct. Already many of his rare plants have been given to nurserymen and amateurs and have thus found their way into many European gardens.

Although the richness of its Chinese species is its most striking feature, the fruticetum at Les Barres is planned to include a comprehensive collection of shrubs that are hardy there, whether European, Asiatic or American. In the arrangement of the Natural Orders and genera, the *Genera Plantarum* of Bentham and Hooker is largely followed. Where the collection is not yet complete, space has been left for the additions as they are obtained. This plan is a wise one, for although it involves the existence of temporary bare spots, it enables a plant to be put in its appointed place once and for all, and avoids the loss and trouble attendant on repeated transplanting where immediate effects are sought.

*Davidia involucrata* is now, through the enterprise of Messrs. Veitch, plentiful in Europe, but it existed at Les Barres for some years before Messrs. Veitch obtained it in quantity from China. The original plant, which is in M. de Vilmorin's private garden, flowered for the first time in 1907. It has flowered again this year, and is now carrying the first fruits ever produced in Europe. These are borne singly on slender stalks, about 4 in. long, and in June were small, pear-shaped, and about $\frac{3}{4}$ in. long.

Among the numerous Chinese roses, a great variety of *R. sericea* forms are perhaps the most interesting. The most striking of these, *R. sericea*, var. *pteracantha*, is notable for its long, flat, translucent, rich red spines. M. de Vilmorin has also many distinct forms of *R. macrophylla* and *R. moschata*.

Many new cotoneasters have found their way into gardens through Les Barres, and there are several others of great promise as yet unnamed. The charming and distinct *C. adpressa*, a low, very dense bush, here covers a space 9 ft. across. *Platycarya strobilacea*, a rare and curious ally of the walnuts, was in blossom; the flowers are greenish white and are borne in large panicles. An unnamed species of *Bauhinia* promises to be hardy, and if so will add quite a new and distinct type to our hardy shrubs.

*Pteroceltis Tatarinovi* is an ally of the nettle-trees (*Celtis*); it has curious winged fruits and is here 30 ft. high. A true nettle-tree (*Celtis heterophylla*) with leaves strangely diverse in shape, is quite distinct from any species previously in cultivation. *Marlea platanifolia*, 12 ft. high, was carrying numerous long white flowers. *Gymnocladus chinensis* is an interesting Asiatic representative of a genus long thought to be exclusively American. *Zelkowa Davidiana* is a new addition to a small and interesting genus. *Æsculus indica*, the Himalayan horse-chestnut, was flowering freely. The new *Ailanthus Vilmorini*, from China, with its curious spiny branches, is represented here by the parent tree of all the plants at present in Europe. These are but a few of the rare and remarkable things to be seen at Les Barres. Very many more exist there, as yet without names, and under numbers only.

## XLIX.—DIAGNOSES AFRICANAE: XXV.

971. **Mesembryanthemum acutipetalum,** *N. E. Brown* [Ficoideae-Mesembryeae]; affine *M. diminuto*, Haw., sed foliis brevioribus erectioribus pedunculo brevissimo et petalis acutis facile distinguitur.

*Herba* perennis, acaulis, multiceps, glabra, radice longa crassa lignosa. *Rami* numerosi, compacti, brevissimi, 0·5-2 cm. longi, foliis 2-4 et vestigiis confertis foliorum delapsorum vestiti. *Folia* erecta, 1·3-3 cm. longa, 5 mm. lata, 4 mm. crassa, semiteretia, dorso carinata, acuta, apiculata, laevia, vix glaucescentia, multipunctata. *Pedunculi* 5-8 mm. longi. *Sepala* latissime ovata vel subrotundata, acuta vel obtusa, membranaceo-marginata punctata. *Petala* numerosissima, 1·5 cm. longa, 0·7 mm. lata, angustissime linearia, acuta, roseo-purpurea. *Stamina* indefinita, patentia. *Styli* 7-8.

South Africa. Transvaal; near Johannesburg, *Turner*.

972. **Mesembryanthemum sexpartitum,** *N. E. Brown* [Ficoideae]; affine *M. Lehmanni*, Ecklon, sed foliis longioribus floribus sessilibus et sepalis 6 facile distinguitur.

*Planta* succulenta, humilis, circa 8 cm. alta, dense ramosa. *Rami* 2·5-7·5 cm. longi, adscendentes vel procumbentes, basi lignosi. *Folia* confertissima vel in ramis florentibus 0·5-2 cm. distantia, 2-5 cm. longa, 5 mm. crassa et lata, subacute trigona, acuta, basi breviter connata, glabra, impunctata, laevia, glauco-viridia. *Flores* terminales, solitarii, sessiles. *Sepala* 6, inaequalia, 10-12 mm. longa, erecta, trigona, acuta, basi anguste membranaceo-marginata. *Petala* 5-6—seriata, pallide flavo-albida; exteriora 1·7-2 cm. longa, 1·5-2 mm. lata, linearia, acuta vel subobtusa; interiora gradatim minora. *Stamina* numerosa, patentia, exteriora vel staminodia ananthera subpetaloidea. *Filamenta* et staminodia alba, apice lutea. *Antherae* albescentes. *Styli* 6, staminibus breviores, patentes, acuti.

South Africa. Karoo, *Pillans*. Flowered at Kew in September, 1908.

973. **Rauwolfia oxyphylla,** *Stapf* [Apocynaceae]; affinis *R. macrophyllae*, Stapf, sed foliis acutissime acuminatis longiuscule petiolatis substantia magis herbacea nervis magis obliquis et curvatis, floribus paulo majoribus distincta.

*Arbor* 9-18 m. alta, glaberrima; ramuli crassiusculi, 4-angulati, nigrescentes, vetustiores subteretes. *Folia* verticillata, quaternata, oblanceolata, saepe tenuiter acutissime acuminata, basi longe cuneata, 15-18 cm. longa, 4-7 cm. lata, membranacea, nervis lateralibus utrinque ultra 20 oblique patulis prorsus curvatis, venis obscure reticulantibus; petioli 2-3 cm. longi. *Cymae* densae in radiis secundariis vel tertiariis umbellae 10 cm. diametro dispositae; pedunculus 3-5 cm. longus; radii primarii 4-5 cm. longi, 3-6-ni, cymigeri 2-0·5 longi, 6-9-ni; pedicelli breves vel brevissimi, maturitate raro 2 mm. attingentes. *Calyx* 1·25-1·5 mm. longus, segmentis e basi ovata vel triangulari acuminatis basi haud obtegentibus. *Corollae* tubus 4-4·5 mm. longus; lobi late ovati,

obtusi, 0·75 mm. longi ; fauces villosae. *Stylus* cum stigmate 3 mm. longus, glaber. *Drupa* globosa vel subglobosa, interdum magis minusve cordata, 7-9 mm. diametro ; pyrenae 2.

UGANDA. Bugoma, in woods, *Dawe*, 711 ; plains below Ruwenzori, 900 m., *Dawe*, 603.

Evidently closely allied to *R. macrophylla*, which has so far been observed only in the Cameroons and the island of S. Thomas (*Ribeiro*, No. 2).

974. **Cryptolepis linearis**, *N. E. Brown* [Asclepiadaceae] ; species ab omnibus foliis linearibus et cymis terminalibus congestis subcapitatis distinctissima.

*Fruticulus* ramosus. *Rami* graciles, minutissime scaberulo-tuberculati, rufescentes. *Folia* opposita, patula, 3·5-7 cm. longa, 1·5-3 mm. lata, linearia, acuta, basi cuneata vel subrotundata, plana vel marginibus revoluta, vix petiolata, utrinque glabra. *Flores* in cymam 20-30-floram terminalem capituliformem congestae. *Bracteolae* numerosae, 1·5 mm. longae, 0·75 mm. latae, ovatae, obtusae, glabrae, apice minutissime ciliatae. *Sepala* 1·75-2 mm. longa 1·5 mm. lata, ovata, obtusa, glabra, apice minutissime ciliata. *Corolla* glabra ; tubus 2·5 mm. longus, campanulatus ; lobi 2·5 mm. longi, 1·5 mm. lati, oblongi vel ovato-oblongi, obtusi ; sacculi ad sinus truncati, minute bidentati. *Coronae lobi* clavati, horizontaliter porrecti.

ANGOLA. Ulondo Mountains, 1360 m. alt., *Wellman*, 1785.

975. **Ceropegia Wellmanii**, *N. E. Brown* [Asclepiadaceae] ; affinis *C. umbraticolae*, K. Schum., foliis cordato-ovatis glabris et floribus minoribus distinctissima.

*Herba* erecta 20 cm. vel ultra alta, caule inferne compresso, glabro, superne parce puberulo. *Folia* patentia vel deflexa ; petiolus 7-10 mm. longus, puberulus ; lamina 3-4·5 cm. longa, 1·3-2·5 cm. lata, elongato-ovata vel latissime ovata, acuta vel obtusa et minute apiculata, basi cordata, utrinque glabra, nervis subtus minute et parce puberulis, minutissime ciliata. *Flores* ad nodos bini. *Pedicelli* 1 cm. longi, minutissime puberuli. *Sepala* 5-6 mm. longa, lanceolato-attenuata, apice recurva, parce et minutissime puberula. *Corollae* tubus 2·2 (vel ultra ?) cm. longus, fere 1 cm. diametro, subcylindricus, superne levissime angustatus, inferne glaber, virescens, prope apicem microscopice et parce puberulus, purpurascens ; lobi apice connati, 2·2 cm. (vel ultra) longi, e basi deltoideo anguste lineares, replicati, marginibus undulatis, dorso minutissime puberuli, intra glabri, atropurpurei. *Corona exterior* cupularis, 10-dentata, dentibus 4 mm. longis erectis linearibus obtusis longe-ciliatis, basi paribus breviter connatis cum denticulo minuto inter iis munitis. *Coronae interioris* lobi 1 mm. longi, antheris arcte incumbentes et breviores, dorso partitionibus coronae exteriori connexi.

ANGOLA. Ulondo Mountains, 1360 m. alt., *Wellman*, 1781.

976. **Euphorbia** (§ Tirucalli) **implexa**, *Stapf* [Euphorbiaceae] ; affinis *E. Bottae*, Boiss. et *E. Schimperi*, Presl, sed dumos densissimos formans, ramis longis vel erectis vel patulis vel pendulis quaquaversus implicatis junioribus superne longe (ad vel

ultra 40 cm.) indivisis; ab *E. Schimperi* etiam cyathiis longius pedunculatis recedit.

*Frutex* humilis, vix metralis, dumosus, glaberrimus; rami teretes, glaucescentes, longi, vel erecti vel patuli vel penduli, quaquaversus densissime implicati, juniores superne longe (ad vel ultra 40 cm.) indivisi, vetustiores ramos secundarios recto angulo patentes emittentes. *Folia* ramorum sterilium numerosa, lanceolata, acuta, 1–1·5 cm. longa, 2–3 cm. lata, declinata, mox delabentia, cicatrices anguste semilunares desinentia, ramorum florentium superiora multo latiora, elliptica, summa umbellam cingentia rhomboideo-rotundata, apiculata, 0·5-0·6 mm. longa. *Umbellae* terminales, radiis 4–6, centrali 3–4 mm., caeteris ad 12 mm. longis. *Cyathium* centrale ♂, ebracteatum, 8 mm. diametro, lateralia ♂, bracteis 2 rotundatis obtusis latioribus quam longis suffulta, 5 mm. diametro. *Involucrum* 5–lobatum (vel in cyathio centrali plurilobatum), lobis brevibus rotundatis magis minusve emarginatis araneoso-ciliolatis, glandulis 5 (vel in cyathio centrali pluribus) transverse ellipticis vel late-subreniformibus integris (vel in cyathio centrali nonnullis emarginatis vel subbilobis); bracteae bracteolaeque araneoso-lanatae. *Ovarium* trigonum, glabrum; stigmata matura non visa.

UGANDA. Mawokota, *E. Brown*, 414.

The habitus description has been drawn up from an excellent photograph of a specimen growing in the Entebbe Gardens, where it had been transplanted from Mawokota. Mr. E. Brown writes that he found the plant only once in the wild state.

977. **Bulbine torta**, *N. E. Brown* [Liliaceae]; affinis *B. minimae*, Baker, foliis crassioribus et valde tortuosis facile distinguitur.

*Bulbus* parvus palmatim divisus. *Folia* 8-10, erecta, valde tortuosa, 3-4 cm. longa, 0·75 mm. crassa, lineari-filiformia, glabra. *Scapus* (cum racemo 2·5 cm. longo) 6 cm. altus, inferne nudus, glaber. *Bracteae* 2·5–4 mm. longae, membranaceae, ovatae, acuminatae, leviter rufescentes. *Pedicelli* 5–6 mm. longi, graciles, glabri. *Perianthii* segmenta valde patentia vel subreflexa, 6 mm. longa, 1·5 mm. lata, lineari-oblonga, obtusa, glabra, lutea. *Staminum* filamenta e basi fere ad apicem pilis clavatis dense barbata; antherae subquadrato-orbiculares, bilobae.

SOUTH AFRICA. Worcester Div.; Karoo at Matjesfontein, Aug., 1895, *F. E. Weiss*, 10.

978. **Andropogon** (§ **Arthrolophis**) **heterantherus**, *Stapf* [Graminaceae]; affinis *A. canaliculato*, Schum., sed culmis inferne tenacioribus, plurinodis, foliis brevioribus, articulis pedicellisque praeter basin barbatam glaberrimis vel subglabris, spiculis pedicellatis angustioribus minoribus, antheris spiculae sessilis 1 mm., spiculae pedicellatae 3 mm. longis distinctus.

*Gramen* perenne. *Culmi* cum innovationibus perpaucis extravaginalibus basi paulo tumidis arcte fasciculati et e rhizomate brevi tenui orti, 0·5 m. vel ultra alti, glaberrimi, laeves, 5-vel pluri-nodi, internodiis plerumque gracilibus sed inferioribus saltem tenacibus teretibus magis minusve exsertis, fere tota longitudine e nodis saepe incrassatis ramosi vel gemmis inferioribus hebetatis, ramis intravaginalibus erectis. *Foliorum* vaginae

arctae, tenuiter nervoso-striatae, basales haud persistentes, caeterae glabrae vel superiores magis minusve hirsutae imprimis superne secundum margines ; ligulae scariosae, ad latera haud herbaceae truncatae, brevissimae ; laminae lineares, longe setaceo-attenuatae, basi constrictae, rotundatae, 10–15 cm. longae, ad 6 mm. latae, planae, basi supra ligulam pilis longis albis barbatae, aliis hinc inde praesertim secundum margines asperas additis, costa tenui, nervis lateralibus primariis utrinque circa 5 supra a secundariis interjectis vix distinctis. *Racemi* geminati culmos et ramos foliatos terminantes, graciles, circiter 10 cm. longi, longe e spatha propria laxiuscula laminam brevem angustam gerente exserti, superior pedunculo circiter 5 mm. longo glabro suffultus, multinodi, flavescentes ; articuli pedicellique 5 mm. longi, similes, clavati, dorso alte convexi, truncati, basi angusti, et breviter barbati, caeterum glabri, nitidi. *Spicula sessilis* inter articulum pedicellumque nodi sui arcte cuneata, a latere compressa, ad 7 mm. longa, callo 1 mm. longo glabro sulcato incluso ; gluma inferior anguste lanceolata, tenuiter acuminata, acumine 2-dentato, dorso profunde canaliculata, superne in carinis subscabrida, caeterum laevis, chartacea, nitidula, nervis utrinque 3, subcarinali viridi, interiore sulcum comitante brunnescente ; gluma superior cymbiformis, acuta, quam inferior vix brevior, chartacea, ciliolata, carina sublaevi, nervo utrinque 1 submarginali ; valvae hyalinae, inferior oblonga, acuta, 5 mm. longa, ciliolata, 2-nervis, superior oblonga, bifida, 3 mm. longa, eciliata, arista geniculata gracili, columna 7–8 mm. longa, seta aequilonga ; palea quam sua valva duplo brevior, alte bifida, enervis. *Spicula pedicellata* lanceolata, acute acuminata, 6–6·5 mm. longa, viridula ; gluma inferior mucronulata, nervis arctissimis circa 9 tenuibus intermedio paulo validiore ; gluma superior 5 mm. longa, acutissima, 3–5-nervis, ciliolata ; valvae anguste oblongae, acutae, hyalinae, inferior ad 5 mm. longa, 2-nervis, ciliolata, superior brevior, delicate 1-nervis, eciliata, cum palea alte bifida duplo breviore. *Stamina* in utraque spicula 3 ; antherae aurantiacae, spiculae sessilis 1 mm. longae, pedicellatae 3 mm. longae. *Caryopsis* oblonga, 2·2 mm. longa. *Ischaemum chrysatherum*, K. Schum. in Engl. Veget. Verh. Usambeira, pp. 14 and 28 (name).

East Africa. Usambara, in bush near Muoa, *Holst*, 3,073 ! also near Amboni, *Holst* (according to Engler, l.c. p. 28).

979. **Andropogon** (§ **Arthrolophis**) **perligulatus**, *Stapf* [Gramineaceae] ; affinis *A. canaliculato*, Schum., sed ligula 1 cm. (vel ultra) longa, articulis pedicellisque vix tumidis, aristis validioribus ad 25 mm. longis distinctus.

*Culmi* (partes superiores tantum extantes) graciles, glabri, laeves, teretes, ad nodos albido-pruinosi. *Foliorum* vaginae superiores subtumidae, ad 5 mm. latae, subcarinatae, glaucovirides vel rubentes, glaberrimae, laevissimae ; ligulae ad 13 mm. longae, scariosae praeter latera firme herbacea nervosa in lobos acutos producta ; lamina anguste linearis, inferne longe attenuata, ultra 20 cm. longa, 3-4 mm. lata, superne aspera, caeterum laevis, glabra, costa albida valida, nervis lateralibus primariis utrinque 2-3, paucis secundariis interjectis. *Inflorescentia* spuria foliata, 2-noda ramo solitario e nodo inferiore ; pedunculi communes graciles, 6-9 cm. longi, in spatha propria angusta vel dilatata

glabra laminam filiformem vel subcapillarem gerente inclusi. *Racemi* 2-nati, sub spathae ore exserti, superior pedunculo 5 mm. longo suffultus, 5-6 cm. longi, flavescentes; articuli pedicellique 3 mm. longi, similes (nisi illi magis cuneati marginibus rectis, hi vero marginibus leviter convexis), praeter basin et margines breviter barbatos ciliatosque glabri, nitiduli, apice suboblique truncati, vix emarginati. *Spicula sessilis* inter articulum pedicellumque sui nodi cuneata, a latere admodum compressa, 5 mm. longa, glabra, callo brevissimo impresso nudo; gluma inferior lineari-lanceolata, minute truncata, dorso profunde anguste canaliculata, superne in carinis spinuloso-ciliolata, caeterum laevis, chartacea, nervis 7-8, utrinque sub carinis 2 vel 3 tenuibus quorum 1 saepe extra-carinalis, 1 utrinque ad sulcum, apice nervo medio brevissimo addito; gluma superior cymbiformis, lata, inferiorem aequans, acuta, subchartacea, lucida, carina superne asperula, marginibus ciliolatis, utrinque nervo submarginali tenui; valvae hyalinae, longe ciliatae, inferior late oblonga, truncatula, 9 mm. longa, 2-nervis, superior late oblonga, biloba, 3·5 mm. longa, arista geniculata, columna pallide brunnea, 10-12 mm. longa, seta aequilonga vel paulo longiore; palea sub-binervis, 3 mm. longa, eciliata. *Spicula pedicellata* lanceolata, acutissima, 1-2-mucronata, 5·5 mm. longa; gluma inferior ad flexuras angustissimas hispidula, in dorso subscaberula, nervis circiter 13 quorum 5 interiores magis distantes, mucrone ad 2 mm. longo; gluma superior dorso convexa, 3-sub-5-nervis, ciliolata, mucrone circa 1 mm. longo; valvae oblongae, 5 mm. longae, hyalinae, ciliatae, acutae, inferior 2-nervis, superior 3-nervis cum palea oblonga subenervi eciliata 3 mm. longa et flore ♂. *Antherae* 3-3·5 mm. longae.

West Africa. Togoland, Misa Höhe, *Baumann*, 318.

980. **Andropogon** (§ **Arthrolophis**) **pinguipes**, *Stapf* [Graminaceae]; affinis *A. canaliculato*, Schum., sed laminis basi longe anguste attenuatis vel petiolatis, articulis pedicellisque altius convexis, gluma inferiore spiculae sessilis late concava distinctus.

*Perennis?* (partes basales desunt). *Culmi* extantes ad 45 cm. longi, graciles, glabri, laeves, infra ramos floriferos 2-nodi. *Foliorum* vaginae arctae, teretes, laeves, nervoso-striatae; ligulae scariosae, truncatae, ciliolatae, ad latera ob vaginam continuatam herbaceae, nervosae, sed haud in auriculos productae; laminae lineares, setaceo-acuminatae, basin versus longe angusteque attenuatae vel petiolatae, ad 20 cm. longae, 5 mm. latae, planae, flaccidulae, utrinque minute puberulae, rubentes, ad margines et nervos scabridulae, costa inferne incrassata albida caeterum uti nervis lateralibus tenui. *Panicula* spuria foliata, 3-4-noda, ramis solitariis vel paucis fasciculatis; pedunculi communes graciles, apice paulo incrassati, 6-8 cm. longi, e spatha propria angusta (rarius dilatata) glabra laminam brevem subulatum gerente breviter exserta. *Racemi* 2-nati, superior pedunculo 4-5 mm. longo glabro suffultus, flavescentes, 3-4 cm. longi; articuli pedicellique simillimi, breviter clavati, in dorso nitido saepe purpureo-maculato valde convexi, facie angusta subconcavi, vix 4 mm. longi, basi et ad angulos (pracipue interiores) breviter ciliati, oblique truncati; pedicelli emarginati. *Spicula sessilis* inter articulum pedicellumque nodi sui cuneata, a latere compressa, triquetra, 5-6 mm.

longa, callo brevi impresso breviter barbato incluso ; gluma inferior lanceolata, minute truncata, dorso late convexa, basi ad callum distincte constricta, superne in carinis asperula, caeterum laevis, chartacea, nitidula, nervis 7-8 praeter duos intimos remotos approximatis tenuissimis ; gluma superior cymbiformis, inferiorem aequans, paulo ultra 1 mm. lata, subacuta, tenuiter chartacea, lucida, carina subasperula, marginibus ciliatis, utrinque nervo 1 submarginali tenui ; valvae hyalinae, longe ciliatae, inferior oblonga, truncatula, ad 5 mm. longa, 2-nervis, superior anguste oblonga biloba, 3·5 mm. longa, arista geniculata, columna pallide brunnea, circiter 9 mm. longa, seta aequilonga. *Spicula pedicellata* ellipticooblonga, acuta, 6-6·5 mm. longa, viridula ; gluma inferior aristulata, aristula ad 3 mm. longa, ad flexuras angustas a medio hispidulo-ciliolata, nervis arctis tenuibus 20-24 aequalibus ; gluma superior inferiori aequilonga, acuta, 3-nervis, ciliata ; valvae oblongae, hyalinae, inferior ad 5·5 mm. longa, latior, obtusa, 3-nervis, 1-nervis, minute bidentata, eciliata, 4·5 mm. longa, cum palea enervi, 2·5 mm. longa et flore ♂. Antherae 3·5 mm. longae.

SENEGAMBIA. M'Bidjen, *Thierry*, 92.

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## L.—NEW ORCHIDS: DECADE 32.

311. **Liparis rhodochila**, *Rolfe*, ad *L. bicolorem*, J. J. Smith, accedit, sed labello non profunde bilobo differt.

*Pseudobulbi* caespitosi, late ovoideo-oblongi, subcompressi, circa 1·5 cm. longi et lati, vaginis ovatis cucullatis vestiti, monophylli. *Folia* elliptico-oblonga, apice minute bidenticulata, circa 7 cm. longa, 3 cm. lata. *Scapi* terminales, erecti, subcompressi, circa 8–9 cm. longi, multiflori. *Bracteae* lanceolatae, acutae, 5–7 mm. longae. *Pedicelli* 8–10 mm. longi. *Sepala* reflexa, oblonga, obtusa, 7–8 mm. longa. *Petala* linearia, obtusa, 7–8 mm. longa. *Labellum* late unguiculatum ; unguis erectus ; limbus arcte reflexus, obovatus, apice truncatus et minute denticulatus, 4 mm. latus ; discus crassiusculus. *Columna* clavata, 4 mm. longa, alis brevissimis et latis.

JAVA.

Sent for determination by Sir Trevor Lawrence, in September, 1908. It was imported byMessrs. J. W. Moore, Rawdon, Leeds, who inform us that it came from Java. The sepals and petals are light green, and the lip reddish crimson. *L. bicolor*, J. J. Smith, is only known to us from description, but besides having a deeply two-lobed lip the leaves and scape are over a foot long.

312. **Bulbophyllum Dixoni**, *Rolfe* ; a *B. Pechei*, Bull (*Bot. Mag.* t. 7286), scapo longiore, floribus brunneo-maculatis et petalis caudato-setiferis differt.

*Herba* epiphytica. *Rhizoma* validum. *Pseudobulbi* pentagoni, ovoidei, monophylli, circa 3 cm. longi. *Folia* oblongo-lanceolata, subacuta, circa 9 cm. longa, 1·5 cm. lata. *Scapi* suberecti, 15–18 cm. longi, prope basin vaginis tubulosis vestiti ; racemi subnutantes, multiflori. *Bracteae* triangulares, acutae, 3–4 mm. longae. *Pedicelli* crassiusculi, 5 mm. longi. *Sepalum* posticum ellipticum, obtusum

vel minute apiculatum, 7 mm. longum; sepala lateralia ovato-oblonga, acuta, 8 mm. longa. *Petala* triangularia, apice caudato-setifera, 4 mm. longa. *Labellum* carnosum, oblongum, obtusum, canaliculatum, 4–5 mm. longum; lobi laterales erecti, late oblongi, obtusi, 1 mm. longi. *Columna* crassa, 3 mm. longa; dentes subulati, 1 mm. longi.

SIAM. Mountains round Chengmai, *Dr. Arthur Kerr.*

Sent for determination from the Trinity College Botanic Garden, Dublin, by Dr. H. H. Dixon, in February, 1908. The flowers are light greenish yellow, with numerous more or less confluent dark brown spots on the sepals, and the lip dusky brown with a yellow median line.

313. **Ione grandiflora**, *Rolfe*; ab *I. Andersoni*, King et Pantl., floribus triplo majoribus et purpureis differt.

*Rhizoma* repens, gracile. *Pseudobulbi* subapproximati, ovoidei, 1·5–2 cm. longi, monophylli. *Folia* oblonga, subacuta, coriacea, 3–5 cm. longa, circa 1 cm. lata. *Scapi* erecti, validi, circa 2 cm. longi, uniflori. *Bracteae* late elliptico-oblongae, acutae, cucullatae, 6 mm. longae. *Sepala* patentia; posticum oblongum, acutum, recurvum, 12–15 mm. longum; lateralia oblonga, acuta, 12–15 mm. longa, basi in mentum brevissimum vel fere obsoletum connata. *Petala* oblonga, acuta, recurva, 10–12 mm. longa. *Labellum* late cordato-ovatum, subobtusum, subcarnosum, 12 mm. longum, 10 mm. latum, facie papilloso-hirsutum, basi concavum et carinatum. *Columna* lata, 3 mm. longa, apice denticulata, facie bidentata, dentibus brevibus crassis et decurvis. *Pollinarii* caudiculae ad glandulas distinctas insertae.

BURMA.

A very distinct species which flowered in the collection of Sir Trevor Lawrence, in November, 1902, and afterwards at Glasnevin, whence the record of habitat was obtained. It most resembles *I. Andersoni*, King et Pantl., in habit, and in having the cadicles of the pollinia attached to two distinct glands, but the flowers are about three times as large, and of a dull lurid purple throughout, while the lip is totally different in structure.

314. **Ione siamensis**, *Rolfe*; affinis *I. scariosae*, King et Pantl., floribus bracteis exsertis et multo longioribus, segmentis patentibus facile distinguenda.

*Rhizoma* repens, subgracile. *Pseudobulbi* tetragono-ovoidei, circa 2 cm. longi, 1 cm. lati, basi vaginis scariosis tecti, monophylli. *Folia* anguste oblonga, subacuta, coriacea, apice subrecurva, circa 7 cm. longa, 1 cm. lata. *Scapi* suberecti, graciles, circa 15 cm. longi, vaginis tubulosis circa 5 tecti; racemi patentes, circa 6 cm. longi, 9–10-flori. *Bracteae* ovato-oblongae, subacutae, scariosae, venosae, 5–7 mm. longae. *Flores* distichi. *Pedicelli* crassi, 5 mm. longi. *Sepala* patentia; posticum ovatum, apice acutum et revolutum, 5 mm. longum; lateralia auguste triangularia, acuta, carinata, 7 mm. longa. *Petala* patentia, late ovata, obtusa, minutissime denticulata, apice subrecurva, 3 mm. longa. *Labellum* anguste ovato-oblongum, obtusum, carnosum, caniculatum, 5 mm. longum. *Columna* brevissima; dentes minutissimi vel subobsoleti. *Pollinarii* caudiculae ad glandulam unicam insertae.

Siam. Mountains round Chengmai, *Dr. Arthur Kerr.*

Sent for determination by Dr. H. H. Dixon, Trinity College Botanic Garden, Dublin, in June, 1908. The flowers are pale green, with a distinct suffusion of dull purple on the lateral sepals and lip, while the other segments have a few minute purple dots near the margin. The appearance of this species fully confirms the inclusion of *Sunipia scariosa*, Lindl., in the genus *Ione*, as proposed by King & Pantling, it being most like the former in habit, and having the rostellum quite similar in structure, while the longer spreading segments agree with *Ione*.

315. **Glomera samoensis**, *Rolfe* ; a *G. montana*, Reichb. f., foliis paullo minoribus, et labello latius differt.

*Caules* validi. *Folia* linearia, apice obliqua, subobtusa, basi paullo latiora, 6–11 cm. longa, 5–10 mm. lata ; vaginae striatae puncticulatae. *Capitulae* sessiles, nutantes, 2–2·5 cm. latae, multiflorae, basi vaginis ovatis concavis imbricatis amplis tectae. *Bracteae* oblongae, obtusae, membranaceae, circa 8 mm. longae. *Pedicelli* circa 6 mm. longi. *Sepalum* posticum elliptico-oblongum, obtusum, 5 mm. longum ; lateralia oblique oblonga, apiculata, basi connata, saccata. *Petala* elliptico-oblonga, obtusa, 5 mm. longa. *Labellum* obovato-orbiculare, obtusum, 3 mm. longum ; saccus globosus, 3 mm. longus. *Columna* lata, 2 mm. longa, dentibus latis obtusis.

Samoa Islands. Apia, *Dr. B. Funk*, 11.

316. **Coelogyne albo-lutea**, *Rolfe ;* a *C. Huettneriana*, Reichb. f., scapis erectis, bracteis persistentibus et labelli lobis angustioribus differt.

*Rhizoma* validum. *Pseudobulbi* ovoideo-oblongi, sulcati, circa 8 cm. longi, basi vaginis ovatis imbricatis obtecti, apice diphylli. *Folia* breviter petiolata, lanceolato-elliptica, acuta, coriacea, 15–18 cm. longa, 4–5 cm. lata. *Scapi* floriferi ad basin pseudobulborum imbricato-vaginati, arcuati, 15–18 cm. longi, 5–7-flori. *Bracteae* lanceolato-oblongae, acutae, 2·5–3·5 cm. longae, persistentes vel subpersistentes. *Pedicelli* circa 1·5 cm. longi. *Flores* speciosi, albi, labello medio flavo. *Sepala* subpatentia, lanceolato-oblonga, acuta, leviter carinata, 2·5–3 cm. longa. *Petala* sepalis similia, non carinata. *Labellum* trilobum, circa 2 cm. longum ; lobi laterales erecti, oblongi, obtusi ; lobus intermedius ovatus, acutus, convexus ; discus ad basin lamellis ternis valde undulatis ornatus. *Columna* clavata, circa 1 cm. longa ; clinandrium membranaceo-dilatatum.

Mountains of N. India.

A distinct and handsome species, introduced by Messrs. Sander and Sons, and flowered in their Nursery, at St. Albans, in May, 1896, and subsequently in the Royal Botanic Gardens, Glasnevin. The flowers are very fragrant, and pure white, with the greater part of the side lobes deep yellow, and the base of the front lobe rather lighter yellow. The keels are white, except at the apex, where they extend into the yellow area.

317. **Coelogyne Loheri**, *Rolfe ;* species insignis, affinis *C. chloropterae*, Reichb. f., sed labelli lobo intermedio magno et emarginato differt.

*Pseudobulbi* fasciculati, ovoideo-oblongi, subcompressi, 4–5 cm. longi, 1·5–2 cm. lati, apice diphylli, vaginis lanceolato-oblongis striatis imbricatis obtecti. *Folia* breviter petiolata, lanceolato-oblonga, acuta vel apiculata, subundulata, prominente 3–5-nervia, coriacea, 12–15 cm. longa, 1·3–2·3 cm. lata. *Scapi* terminales, a pseudobulbo immaturo producti, erecti, 12–15 cm. longi; racemi flexuosi, circa 5–7-flori. *Bracteae* deciduae, lanceolato-oblongae, acutae, striatae, concavae, 1·5–2·5 cm. longae. *Pedicelli* graciles, 1–1·5 cm. longi. *Sepala* oblonga, acuta, carinata, 2–3·3 cm. longa; lateralia 6 mm. lata; posticum 9 mm. latum. *Petala* linearia, acuta, 2–2·3 cm. longa, 2 mm. lata. *Labellum* elliptico-oblongum, trilobum, 1·8–2 cm. longum, 10–12 mm. latum; lobi laterales oblongi, obtusi, breves; lobus intermedius late ovatus, emarginatus, undulatus; discus 5-carinatus, carinis valde crispo-undulatis. *Columna* clavata, alata, 1·2 cm. longa.

PHILIPPINES. Prov. Benguet; without precise locality, *Loher*, 549, 552.

318. **Scaphyglottis alba**, *Rolfe*; a *S. longicauli*, S. Watson (ex descriptione), pseudobulbis brevioribus, floribus multo minoribus et albis differt.

*Caules* fasciculati, anguste fusiformi, circa 4–5 cm. longi, vaginis pallidis striatis obtecti, apice diphylli. *Folia* linearia, apice minute biloba, subconduplicata, submembranacea, 4–6 cm. longa, 3–4 mm. lata. *Flores* fasciculati, terminales, albi. *Bracteae* lanceolatae, acuminatae, circa 3 mm. longae. *Pedicelli* 7–8 mm. longi. *Sepala* subconniventia, oblonga, subobtusa, circa 4 mm. longa. *Petala* sepalis paullo angustiora. *Labellum* subintegrum, cuneato-oblongum, obtusum vel retusum, fronte subundulatum, sepalis paullo longius. *Columna* clavata, 3 mm. longa, edentata; pollinia 4, compressa.

COUNTRY unknown.

Flowered in the Royal Botanic Gardens, Glasnevin, in May, 1908. First obtained from Messrs. Sander & Sons, in October, 1905, without any indication of habitat. The flowers are small, white, and borne in fascicles of 3 or 4 together.

319. **Maxillaria pusilla**, *Rolfe*; habitu *M. parahybunensi*, Cogn., similis sed foliis paullo angustioribus et labello subintegro et obtuso differt.

*Caules* brevissimi, robustiusculi, satis ramosi. *Pseudobulbi* lineari-oblongi, sulcati, vaginis imbricatis striatis tecti, circa 1 cm. longi, monophylli. *Folia* lineari-lanceolata, subacuta, crasso-coriacea, sessilia, 3–5 cm. longa, 3–5 mm. lata. *Scapi* solitarii, brevissimi, pseudobulbis breviores, vaginis imbricatis brevibus tecti. *Sepala* oblonga, obtusa, circa 1 cm. longa; lateralia paullo latiora, basi in mentum brevem obtusum extensa. *Petala* anguste oblonga, subobtusa, circa 1 cm. longa. *Labellum* subintegrum, obtusum, supra medium paullo recurvum, fere 1 cm. longum; discus nitidus et callo oblongo carnoso instructus. *Columna* clavata, circa 7 mm. longa.

COUNTRY unknown.

Sent for determination by Messrs. Sander & Sons, St. Albans, with whom it flowered in July, 1908. The sepals and petals are brownish green, somewhat darker at the base, and the lip dark purple and very shining, with a lighter apex. The allied species are natives of Brazil.

320. **Sigmatostalix Eliae**, *Rolfe*; affimis *S. pictae*, Reichb. f., sed partibus omnibus minoribus et floribus maculatis differt.

*Pseudobulbi* compressi, ovato-oblongi, circa 1·5 cm. longi, apice monophylli, basi 2–3 phylli. *Folia* oblonga, oblique et brevissime bidentata, tenuia, basi attenuata, 2–7 cm. longa, 6–13 mm. lata. *Scapi* tenues, circa 18 cm. longi, multiflori. *Bracteae* lanceolato-oblongae, circa 4 mm. longae. *Pedicelli* 3–4 mm. longi. *Sepala* et *petala* oblongo-lanceolata, acuta, reflexa, 6–7 mm. longa. *Labellum* patens, late unguiculatum, 3-lobum; lobus intermedius reniformi-orbicularis, convexus, 7–8 mm. latus, apice reflexus et acutus; lobi laterales reflexi, lineari-oblongi, obtusi, 2 mm. longi; unguis 3 mm. longus. *Columna* clavata, arcuata, basi gracilis, 5 mm. longa, alis obsoletis.

COLOMBIA. Velez district, *Birchenall.*

Flowered in the collection of Mr. Joseph Birchenall, Alderley Edge, Cheshire, in January, 1908, and dedicated by request to his wife. It was found growing in the Velez district, at a lower altitude than *Odontoglossum crispum*, Lindl., in intermediate temperature. The flowers are yellow, spotted with reddish brown on all the parts.

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## LI.—A LANCASHIRE WILLOW FARM.

W. DALLIMORE.

For upwards of half a century the village of Mawdesley has been famous for its willow beds and basket-making industry, and Mawdesley-grown rods have acquired a considerable reputation in the willow trade for strength and durability. Mawdesley differs from most willow-growing centres in possessing very little wet or marshy land, and willows are grown under similar conditions to such farm crops as potatoes, cabbages, corn, &c. It is to this comparatively dry method of culture that the special toughness of the rods grown in the district is attributed.

Mawdesley is situated in south-west Lancashire, almost midway between Liverpool and Preston, at the foot of Harrock and Parbold hills. The nearest station is Rufford, a distance of about 2½ miles, whilst the nearest important town is Wigan, which lies a few miles away in the opposite direction.

Being in the neighbourhood recently, I took the opportunity of paying a visit to the farm of Mr. Hugh Cowley, who is the largest grower in the district, for the purpose of obtaining information as to the methods of culture adopted, and Mr. Cowley very kindly furnished me with the particulars embodied in the following notes.

The pioneer of the movement in Mawdesley was Mr. Cowley's father, and his first venture was with a farm of 11 Cheshire acres (= about 23¼ English acres). As he had learnt from old growers that willow beds were only remunerative up to 14 years of age, he obtained a lease for that period. His methods of culture, however, proved so effective, that at the time his lease ran out the beds were more productive than they had ever been, and he was glad to renew his lease at an increased annual rental of £30. For many years the business proved highly satisfactory, and more land was continually required until he and his sons had about 500 acres under cultivation. Other farmers also planted largely when the trade was at its best, but of late years, owing principally to depression in trade and foreign competition, a considerable amount of land has been reclaimed for ordinary farm crops. According to Mr. Cowley, however, taking good and bad years together, willows pay at least as well as other farm crops.

When forming a willow bed, the ground is well worked and cleaned, and good, strong cuttings are inserted one foot apart in rows two feet apart. The majority form sturdy plants the first year, and are assisted by being kept perfectly free from weeds and by frequent working of the surface soil. In fact, to be successful with a crop of willows, Mr. Cowley contends that throughout life they must be kept as free from weeds as any other crop. A full crop of rods may be expected from strong-growing varieties the third year after planting, but weak-growing kinds require a year or two longer. Harvesting operations are got through as quickly as possible after the fall of the leaves. Usually, the stools are cut over annually, but when specially strong rods are required, they are allowed to remain for two years. When cutting the rods, great care is taken to remove them close to the stool. If this is not done, numerous buds are left, which result in large numbers of weak shoots the following year instead of a smaller number of more vigorous ones. As soon as possible after the removal of the crop, the ground is well cleaned and worked, and a dressing of manure is given. The manure which finds most favour with Mr. Cowley is a Manchester production prepared principally from night soil. This is sold in bags, and is easily transported. The usual dressing is at the rate of one ton to the acre, and this is repeated in spring, an additional dressing being given a month or two later if the ground is poor. When carefully cultivated, a willow plantation will give good results for a very long period. I was shown fields in full vigour which had been down between 20 and 30 years, and still older ones exist. In the event of a bed being neglected and left unworked and unmanured, it is ruined in from three to five years. The destruction of a willow bed is a simpler operation than would be expected. A strongly horsed plough is run along a row close to the stools ; it is then run along the opposite side, turning the stools over ; men follow, and drag the plants out ready for the next furrow. In this way a field is ploughed in very little more time than a clear field would be.

When removed from the ground the rods are made into stacks and are left for use. Many of the finer-growing sorts are peeled for fancy work, and the peeling is done as the rods are harvested. Previous to peeling they are soaked in boiling water. From the

boiler they are taken to the stripping room where the bark is removed by women. The rods are then placed in a heated shed to dry, after which they are graded into sizes ready for use. Although attempts have been made to find a use for the bark they have so far failed, and it is simply a waste product.

A few years ago baskets of all descriptions were made both for English and foreign markets, but now only those kinds are made for which there is a local demand, and the majority of the rods suitable for fine work are sold ready for use. A brisk trade is carried on in potato hampers, and there is a good demand for pigeon and fowl baskets.

The majority of the varieties of basket-making willows grown in the country have been tried at Mawdesley, but most of them have been discarded as unsuitable for the district, and only a few selected forms of two or three species are grown, which are recognised by local names. Specimens were, however, obtained, and in the following descriptions they are allotted to their respective species.

The varieties are :—

"Red Buds" or "Old Dicks"; "Long Skeins" or "Light Long Skeins"; "Black Stemmed"; "Mawdesley's Long Skein"; and "Ran Dan." Two others known respectively as "Tulip Willow" and "Kecks" were at one time widely grown, but have been superseded by "Red Buds."

"Red Buds" or "Old Dicks" is a well-marked form of *Salix purpurea*; the botanical variety *scharfenbergensis* most closely approaches it in general appearance. It is of comparatively weak growth, and is conspicuous by reason of its red stems and buds. It is the most useful of all the willows grown in the district for neat or fancy work, and usually commands the best price. The rods are always used in a peeled state and are obtainable in five different sizes, the longest ones being from 4 to 4½ ft. in length, the shortest 2 to 2½ ft. The first-mentioned name evidently applies to the prominent red buds, whilst the latter is an abbreviation of "Old Dick Meadow's Willow." Richard Meadows was an employé of the Earl of Lathom, and amongst his other duties he manufactured rough wicker baskets for the distribution of game. On one occasion he noticed some nice willow rods round a bundle of imported plants. From these he procured cuttings which resulted in superior rods to anything he had previously worked. He distributed cuttings amongst his friends and Mr. Cowley obtained a quantity. These became so popular that on one farm alone upwards of 100 tons are frequently produced in a single season. The yield of rods per acre of this variety is from eight to nine tons. *S. purpurea*, the "Purple Osier," is widely distributed through Europe and Central and Northern Asia, and is a variable plant.

The variety called "Kecks" is a form of *S. purpurea* with green bark and larger leaves than the form already mentioned; it is, however, of very inferior merit, and has been discarded.

"Long Skeins," or "Light Long Skeins," is a stronger-growing willow than the last mentioned, of very good quality. It is a selected form of the British *Salix viminalis*, and was originally imported to Mawdesley from Knowsley. It is used both plain

and peeled, and is suitable for many kinds of work. The longest rods of a single year's growth are from 6 to 8 ft., those of two years' growth being some 3 or 4 ft. longer.

"Mawdesley's Long Skein" is another European species, *Salix rubra*. It grows to about the same height as the last named form, and is used for similar purposes, both peeled and unpeeled, the rods are, however, said to be slightly harder to work.

"Black Stemmed" or "Black Willow" is *Salix daphnoides*, the "Violet Willow" of Europe, &c. This has not been in use many years, but is thought highly of for the larger kinds of work. Rods 12 ft. in length are produced in a single season, which are found to be of excellent quality for farm baskets. The peculiar glaucous or bluish colouring seen on growing rods is even more conspicuous after the rods have been dried. My attention was called to a number of potato baskets where this particular variety had been used in bands with another variety, and in the distance the appearance was exactly that of bands of light blue paint.

"Tulip Willow" is a form of *S. rubra*. It is said to produce rods of good quality, but has been discarded in favour of "Red Buds" on account of its liability to produce side branches, which cause extra expense in preparing for use. A peculiarity of the variety is the habit the rods have of dividing into double growths when about half grown.

"Ran Dan" concludes the varieties grown. It is correctly *Salix Smithiana* var. *acuminata*. The rods are strong and grow to a good length the first season. They are, however, usually allowed to grow for three or four years, and are then used for splitting to use in the bottoms and sides of strong hampers.

In conclusion, it may be of interest to note that the willow industry at Mawdesley had its origin through the chance visit of a basket-maker to the neighbourhood. He noticed a patch of willows growing in an out-of-the way corner of a field, and offered the farmer a price for them, which seemed more than the land was worth. This led to the first idea for a willow farm.

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## LII.—BAGNISIA HILLII, Cheesem.

### A New Species of Burmanniaceae from New Zealand.

The following note and diagnosis of a new species of *Bagnisia*, has been received from Mr. T. F. Cheeseman, of Auckland, New Zealand, for publication in the *Bulletin* :—

The *Burmanniaceae* are very largely tropical in their distribution, so that considerable interest attaches to the discovery of a species so far to the south as New Zealand. In January, 1903, Mr. H. Hill, of Napier, forwarded to the writer a single specimen of a plant found by him at Opepe, near Lake Taupo, which, from its habit and general appearance, was at once provisionally referred to the family, although the condition of the specimen was such that positive identification was impossible. A special journey

made to Opepe in company with Mr. Hill resulted in the discovery of another specimen, also in an imperfect state. In January of this year I succeeded in inducing Mr. Hill to pay another visit to the locality, when he was fortunate enough to find a considerable number of specimens in full flower, most of which he kindly forwarded to me. An examination of these has proved that the plant belongs to the sub-family *Thismieae*, which differs from the rest of the *Burmanniaceae* in possessing both the inner and outer whorls of stamens, and in the unusually large development of the anther-connective. It further appeared that there was little to separate Mr. Hill's plant from the genus *Bagnisia*, as amended by Engler in *Die Natürlichen Pflanzenfamilien* (vol. ii. 6, p. 48), where it is made to include both *Bagnisia* and *Geomitra* of Beccari (*Malesia*, vol. i. pp. 249–250, tt. 10, 11, 12), the only difference of importance being that in *Bagnisia* and *Geomitra* three of the perianth segments are wanting, or reduced to mere rudiments; whereas in the New Zealand plant they are well-developed, being quite half the length of the inner segments. In this respect it agrees with the genus *Thismia*, but differs in the inner perianth segments being dilated and connivent at the tips, exactly as in *Bagnisia* and *Geomitra*. In the position of the stamens and in the structure of the anther it agrees with *Geomitra*; in fact the anther-connective of *Geomitra episcopalis*, as figured by Beccari, very closely resembles that of the New Zealand plant. If, therefore, Engler is to be followed in merging *Geomitra* with *Bagnisia*, it appears to me that the New Zealand plant should be placed in the latter genus.

**Bagnisia (Geomitra) Hillii**, *Cheesem.* *Planta* saprophytica, humicola, pusilla, glaberrima, foliis ad squamas minutas redactis. *Rhizoma* repens inter folia emortua delapsa sylvarum, parce vel copiose ramosum, 5–10 cm. longum, 1–1·5 mm. crassum, nudum, carnosum. *Pedunculi* ex axillis bractearum brevium carnosarum, orti, uniflori, erecti vel curvati, 0·5–1·5 cm. longi, bracteolis circiter 7 alternis lanceolatis vel ovato-lanceolatis acutis albidis sursum gradatim majoribus 1–5 mm. longis instructi. *Flores* rosei, ratione plantae magni, 1–1·7 cm. longi, circiter 7·5 mm. diametro. *Perianthium* campanulato-lanterniforme; tubus obovato-oblongus, 6-costatus; segmenta 3 minora omnino exteriora, libera, ovato-oblonga, oblique patentia, demum longitudinaliter arcte recurva, in alabastro fenestras obtegentia; segmenta 3 interiora quam exteriora fere duplo longiora, apice connata vel conniventia, medio hiantia, obovato-oblonga, dorso carinata, carina in apiculum producta. *Stamina* 6, fauci affixa et breviter exserta, abrupte decurva et intra tubum deflexa, filamentis brevibus, liberis; connectiva maxima, in tubum membranaceum connata, apice bilamellata; loculi parvi, distincti, adnati. *Ovarium* inferum, late obovatum, uniloculare, placentis 3 liberis; ovula numerosissima; stylus brevis, crassus, apice trifidus, ramis in limbum parvum subquadratum concavum productis. *Fructus* ignotus.

New Zealand: Northern Island; in primeval woods at Opepe, near Lake Taupo, *H. Hill*; *T. F. Cheeseman*.

*Bagnisia Hillii* is usually found on the mound of decaying leaves and humus which accumulates at the base of the trunk of

the Kahikatea Pine, *Podocarpus dacrydioides*. On account of its small size it is easily overlooked, even in the flowering season, the flowers being often partially concealed by fallen leaves. Once noticed, however, the bright rose-pink colour of the flowers enables the observer to pick it with ease. A drawing of the plant, with full analyses, will appear in the forthcoming "*Illustrations of the New Zealand Flora*," the preparation of which was announced in a recent number of this publication.

According to the most recent enumeration, that given by Dr. Pilger (Engler & Prantl, *Naturl. Pflanzenf. Nachtr.* iii., p. 72), four genera of *Thismieae* are now known, with about 14 species. Seven of these are from Brazil; the remainder come from Ceylon, Borneo, and New Guinea. The discovery of an additional species in New Zealand is a decidedly unexpected and somewhat puzzling fact in geographical distribution.

In the northern hemisphere the family is represented northward to China and Japan, and as far north as Virginia in America.

## LIII.—MISCELLANEOUS NOTES.

Mr. Thomas Cartwright, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Sudan Government, on the recommendation of Kew, Superintendent of an experimental rubber plantation at Jebelein, on the White Nile.

Mr. Robert Band, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, a Curator of Botanic Stations in the Agricultural Department of the Gold Coast.

Mr. J. F. Duthie, B.A., F.L.S., who was appointed Assistant for India on the staff of the Royal Botanic Gardens in 1903 (*v. Kew Bull.*, 1903, p. 29) has resigned the post owing to ill-health.

Mr. J. Hutchinson, formerly a member of the gardening staff, has been appointed Assistant for India on the staff of the Royal Botanic Gardens by the Secretary of State for India in Council.

Sir Daniel Morris.—The retirement of Sir Daniel Morris, K.C.M.G., D.Sc., from the post of Imperial Commissioner of Agriculture for the West Indies was announced in the issue of the *Times* of October 13th, 1908.

He was appointed to this post in August, 1898 (*v. Kew Bull.*, pp. 234–237), and has occupied it with conspicuous success to the great benefit of the West Indian colonies. Under his careful and zealous management, agriculture in the West Indies has been placed on a firm and sound basis, and has been systematically organised throughout the various islands. Amongst the most useful of the works which have been encouraged and developed by

the Imperial Commissioner are the cultivation of cotton, the improvement of the sugar cane by hybridisation, and the extension of the culture of limes, cocao, &c. With regard to cotton, Sir Daniel revived its cultivation after a lapse of about 100 years, and personally introduced the Sea Island seed—the best long-staple cotton—into the islands. The cotton from the West Indies, especially that from St. Vincent, now obtains as high a price as any in the Manchester market. The experimental work on the sugar cane carried out by the Imperial Department of Agriculture, has been instrumental in giving a fresh impetus to sugar cultivation, which at one time appeared to be a doomed industry. At the Agricultural Conference, held in January last at Barbados, Sir Daniel was able to say that—"It is not improbable that in the near future seedling canes capable of resisting disease, while at the same time yielding a higher percentage of sugar, will be generally cultivated in these colonies."

One of the most important features of his administration has been the establishment of the intercolonial agricultural conferences, seven of which have been held during the ten years of his tenure of office. These have been of great value in bringing together the agriculturists and leading men of the various islands, and have helped to co-ordinate the work and stimulate agricultural interests in the different West Indian Islands.

In Sir Daniel Morris the West Indies are losing one who has given his best for the improvement of the conditions of the islands. He has handed on to his successor, Dr. Francis Watts, C.M.G., D.Sc.—the Superintendent of Agriculture for the Leeward Islands—a well-organised and thoroughly efficient department.

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George Nicholson.—After a long and painful illness our esteemed friend and former colleague passed away peacefully on Sunday, September 20, in his sixty-first year. The son of a nurseryman of Ripon, Yorkshire, he grew up in a garden, and early developed a taste for flowers and for gardening. As a child he had a plot of ground assigned to him to lay out and cultivate as he pleased, and in those early days he showed great skill, we learn, in constructing miniature villas in their own tastefully planned gardens. He also formed a small rock garden and embellished it with a fountain engineered by himself. With increasing years he acquired a sound knowledge of the plants in his surroundings, both cultivated and wild, and he made a special study of hardy trees and shrubs, which gained for him the not undignified nickname of "Quercus." His education was of the ordinary "grammar school" kind, and he began working in his father's nursery-gardens while still quite young, remaining there until after manhood. At length the desire to see more and gain wider experience was irresistible, and he worked successively in the nurseries of Messrs. Fisher Holmes, of Sheffield, and Messrs. Low, of Clapton; afterwards going to Paris, where he obtained employment in the municipal gardens of La Muette. During the time—about two years—spent in France he laid the foundation of a knowledge of the French language, to which he was continually

adding almost to the last, and so fully did he realise the value of such knowledge that he was constantly impressing upon young men the desirability of learning at least one modern language. He went even further and devoted much time to the gratuitous teaching of others.

The turning point of Nicholson's life came in 1873. By chance he saw an advertisement inviting candidates for the post of Clerk to the Curator of the Royal Gardens, Kew, and he entered, with little hope of success, as there was absolutely no time for special preparation for the examination. There were five candidates, but he "displayed such quickness, intelligence and resources, and had so good an address" that he was finally successful. Although at first he was engaged almost entirely during official hours on clerical work, his activity out-of-doors commenced at once, for we find in the Journal of Botany, 1874, p. 127, that he was engaged on a Wild-Flora of Kew Gardens, which appeared in the same publication in 1875. He also continued his studies of the British Flora generally, with great enthusiasm, and made a very fine herbarium, which he eventually presented to the University of Aberdeen. He was very keen on segregates, and among others he collected a very fine series of the forms of *Cardamine pratensis*, among them *C. dentata*, Schultz, and *C. Hayneana*, Welw. In 1883 he discovered a *Scutellaria* at Virginia Water, which was regarded as a natural hybrid between *S. galericulata* and *S. minor*. In this connection it may be added that he joined the Botanical Exchange Club of the British Isles in 1875, and was Distributor and Reporter for the years 1883 and 1887.

The Director of Kew had been engaged for many years on the extension and nomenclature of the Arboretum before the appointment of Nicholson, who early took a great interest in it, but some years elapsed before he was officially associated in this task. About 1880 he began collecting and drying specimens of the hardy shrubs and trees, and checking their names, and in time the collection developed into a valuable herbarium for reference, supplemented, as it was, by figures, descriptions and correspondence relating to the specimens. In 1889 the collection was purchased by the Trustees of the Bentham Fund and presented to the establishment; since when it has been continually added to by his successors, and it is now probably the most nearly complete of its kind. Under the heading of "The Kew Arboretum" Nicholson published a series of twenty articles in the *Gardeners' Chronicle* for 1881, illustrated by Miss M. Smith. This series was followed by numerous papers on dendrology in various publications, references to the most important of which will be found in the Bibliography at the end of this memoir.

An official recognition of his work in the Arboretum appeared in the *Kew Bulletin*, 1901, p. 169. "Mr. Nicholson's services to Kew are well known. To him in great measure is due the present efficient condition of the Arboretum. The 'Handlist of Trees and Shrubs' was prepared by him, and is universally accepted as a standard authority for their nomenclature. Kew still hopes to retain the benefit of his botanical experience now that he has been relieved from the pressure of administrative duties."

On the retirement of John Smith the second, in 1886, Nicholson was promoted to the post of Curator, which he held until compelled by bad health to resign in 1901. At the time of his appointment he was in the midst of his great work, the "Dictionary of Gardening," which made him famous throughout the gardening world. An enlarged French edition, edited by his friend, S. Mottet, appeared during the years 1892–1899, and L. H. Bailey's "Cyclopaedia of American Horticulture," 1900–1902, is compiled on the same model. This is not the place to enlarge upon Nicholson's high and varied attainments, and the benevolent traits of his character, which brought him universal esteem and admiration. The Horticultural Press has done this and is unanimous in its appreciation of his talents and personal character. Always modest, he shrank from anything in the form of a public testimonial, but on his retirement a complimentary dinner was given in his honour, presided over by the late Dr. M. T. Masters, and a handsome silver salver was presented to him by his friends and colleagues, "who, while admiring his qualifications as a man of science and a gardener, have a warm appreciation of his worth as a friend."

He was elected an Associate of the Linnean Society in 1886, and became a Fellow in 1898; and he was one among the first sixty recipients of the Victoria Medal of Honour in Horticulture, on its institution in 1897. Mr. William Robinson, who was also a personal friend, dedicated to him in 1895 the forty-eighth volume of 'The Garden' in the most eulogistic terms. In 1894 he was awarded the Veitchian Medal. Among other distinctions he enjoyed was that of being first President of the Kew Guild, to which he was elected in 1894. For many years he was a member of the Scientific and Floral Committees of the Royal Horticultural Society, and he was a regular attendant during his later years until his malady reached a stage that prevented him from going out.

Nicholson was fond of travelling and of mountaineering, and he continued the latter at an age when it probably became detrimental to his health. Apart from his climbing expeditions, most of his journeys on the Continent were made in the company of the late H. Herbst, with whom he visited many parts of France and Germany and some parts of Italy and Spain. Notes on one of these journeys to Southern France and Northern Italy were published in a series of articles in the 'Garden and Forest' for 1889 and 1890. He twice visited America; the first time in 1893, and again in 1902. On the first occasion he acted as a judge in the horticultural section of the great Chicago Exhibition, and visited, in the interests of Kew, the celebrated Arnold Arboretum and many of the leading horticultural establishments of the Eastern States. An interesting report of this journey will be found in the *Kew Bulletin*, 1894, pp. 37–66. Being somewhat better in health in 1902, he accepted the position of a Delegate from the Royal Horticultural Society to the newly founded Horticultural Society of New York, on the occasion of the Conference on Plant Breeding and Hybridism. This journey proved very unfortunate for him; an acute attack of pleurisy bringing him almost to death's door.

After his return home his health improved considerably, and he was much in request as an adviser by owners of gardens and estates ; but he soon found the travelling too arduous, and eventually declined all invitations.

The rest of his active life was largely devoted to the further investigation of the fauna and flora of the gardens he loved so well. Latterly it was the Fungi and Lepidoptera that almost exclusively engaged his attention, and nothing could dissuade him from spending hours in the damp underwood of the Queen's Cottage grounds in search of microscopic fungi. He even paid nocturnal visits in quest of moths. The additions to the Lepidoptera in the current volume of the *Bulletin* were mostly captured by him. A notable discovery was the Spurge Hawk moth, *Deilephila Euphorbiae.*

Close upon 2,000 species of fungi are known to occur in the gardens, and Nicholson alone collected about 500 of them. Among his discoveries the following were quite new to science : *Dasycypha abscondita*, Massee, *Humaria Nicholsonii*, Massee, *Pleuroascus Nicholsonii*, Massee and Salmon, and *Milowia amethystina*, Massee.

His later visits to the Gardens were in a Bath chair, and they were continued to within a week or two of his death.

Nicholson was a great reader, and he had a considerable and very miscellaneous collection of books, including many French, some German, Italian and Spanish, chiefly purchased of second-hand dealers ; and at the death of the late Mr. Herman Herbst he inherited his books. On his rounds of the book-shops Nicholson always thought of Kew, and from time to time he discovered a book or a pamphlet not in the Kew library, which he either presented or reported, thus giving us an opportunity of purchasing. Among the books presented by him were the "Album Van Eeden," the "Album Benary," Victor Petit's "Parcs et Jardins des Environs de Paris," Kidder & Fletcher's "Brazil and the Brazilians," and the "Transactions of the English Arboricultural Society," from the beginning. He also presented the third, or 1844, edition of Loddiges' remarkable catalogue of Orchids, which contains 1916 numbers, with native countries, dates of introduction and references to figures of the species enumerated.

Finally, it may be said that George Nicholson was devoted to Kew, and discharged his duties to the establishment and to those under him in such a manner as to gain the esteem and admiration of all concerned. Many an old Kewite will remember with gratitude how much he owes to Nicholson's timely advice and unfailing readiness to encourage and assist.

## Bibliography.

For many years Nicholson was a prolific contributor to the Horticultural Press, and his articles mostly contain original critical matter of permanent value. The following list is by no means exhaustive, as he often wrote anonymously, but it will give some idea of the scope and extent of his literary work.

The Wild Flora of Kew Gardens and Pleasure Grounds. Journ. Bot. 1875, vol.xiii., pp. 9, 42, 71.

Gallitrichum rubellum, Jord. & Fourr. (Salvia Verbenaca, L. var.) in Surrey. Journ. Bot. 1879, vol. xvii., p. 344.

On Spergula arvensis, L. and its segregates. Journ. Bot. 1880, vol. xviii., p. 16. Cardamine pratensis, L. and its segregates, p. 199. Tolypella glomerata, Leonh. in Yorkshire, p. 373.

Development of heat in the flowers of Phytelephas. Journ. Bot. 1881, vol. xx., p. 154.

The Kew Arboretum. The Maples. Gard. Chron., 1881, vol. xv., pp. 10, 42, 74, 136, 172, 268, 299, 365, 499, 532, 564, 725, 788; 1881, vol. xvi., pp. 75, 136, 375, 590, 719, 750, 815. (Illustrated by Miss M. Smith.)

The Kew Arboretum. The Oaks. Gard. Chron., 1882, vol. xviii., p. 107; 1883, vol. xix., p. 597.

Utricularia neglecta, Lehm. in Middlesex. Journ. Bot., 1883, vol. xxi., pp. 85–6.

The Kentucky Coffee Tree. The Garden, 1883, vol. xxiv., p. 29. The Yellow Wood, p. 96. The Sweet Gums, p. 166. The Sophoras, p. 211. The Hop Hornbeams, p. 231. Cladrastis amurensis, p. 264. Escallonia Sellowiana, p. 291. The Planer Tree, p. 370. The Hornbeams, p. 418. The Magnolias, p. 508. The Zenobias, p. 572.

The Illustrated Dictionary of Gardening. A Practical and Scientific Encyclopaedia of Horticulture. 4 vols. 4to., 1884–1888. French edition, 1892–1899. The 1900 Supplement, 1900–1902.

The genus Cercis. The Garden, 1884, vol. xxv., p. 347. A New Shrub, Sarcococca Hookeriana, p. 359. The Laburnums, p. 518.

The Catalpas. The Garden, 1884, vol. xxvi., p. 164. The White Birch and its Varieties, p. 291. The Rockroses, p. 420.

Petasites officinalis, Moench. Journ. Bot., 1884, vol. xxii., p. 251.

The British Oaks. Woods and Forests, 1883, vol. i., p. 8. The Turkey Oaks, p. 52. New Japanese Evergreen Oak, 1884, vol. i., p. 84. The Black Jack or Barren Oak, p. 159. The Zelkowas, p. 176. The Giant Arbor Vitae and the White Cedar of California, p. 190. The Deciduous Cypress, p. 217. The Ailanto or Tree of Heaven, p. 231. Quercus dentata, p. 235. The Indian Hemlock spruce, p. 243. The Tulip Tree, p. 262. Horse Chestnuts and Buckseyes, p. 289. The Kentucky Coffee Tree, p. 290. The Hop Hornbeams, p. 318. The genus Corylopsis, p. 332. The London Plane, p. 346. The Hornbeams, p. 360. Cladastris amurensis, p. 382. The Sweet Gums, p. 431. The Sophoras, p. 500. Phillyrea Vilmoriniana, p. 529. The Oak of Lebanon, p. 628. Pinus Ayacahuite, p. 655. Prunus Pissardii, p. 675.

The Catalpa. Woods and Forests, 1885, vol. ii., p. 51. The Sugar Maple, p. 83. Quercus lobata, p. 87. The White Birch and its Varieties, p. 115. The Laburnums, p. 162.

Report of the Botanical Exchange Club of the British Isles for 1883. Issued 1885.

The Cistuses. The Garden, 1885, vol. xxvii., p. 570.

Prunus triloba. The Garden, 1885, vol. xxviii., p. 346. Large-fruited Hawthorns, p. 632.

Yellow Roses. Gard. Chron., 1885, vol. xxiv., p. 468.

Fremontia californica. The Garden, 1886, vol. xxix., p. 8.

Rosa Ripartii, Déséglise, in Britain. Journ. Bot., 1886, vol. xxiv., p. 111.

Specimen Trees in Kew Gardens. Gard. Chron., 1888, vol. iv., pp. 504, 602, 724, 764.

Hardy Azaleas. The Garden, 1888, vol. xxxiv., p. 416.

The Kew Arboretum. Garden and Forest, 1888, vol. i., pp. 40, 53, 101, 136.

Report of the Botanical Exchange Club of the British Isles for 1887. Issued 1888. (Greater part reproduced in the Journal of Botany, 1889, vol. xxvii., pp. 52–59.)

Holiday Notes in Southern France and Northern Italy. Garden and Forest, 1889, vol. ii., pp. 494, 508, 518, 532, 555, 567, 578, 603; 1890, vol. iii., pp. 3, 15, 99, 111, 150.

The Kew Arboretum. Garden and Forest, 1889, vol. ii., p. 207.

Specimen Trees in Kew Gardens. Gard. Chron., 1889, vol. v., pp. 44, 264.

History of the White Lilac Industry. Garden and Forest, 1889, vol ii., p. 88.

The Barberries. The Garden, 1889, vol. xxxv., p. 264. The Gordonias, p. 409.

Evergreen Oaks. The Garden, 1891, vol. xl.. p. 95.

Conifers as Specimen Trees and for Landscape Gardening. Journ. Roy. Hort. Soc., 1892, n.s. vol. xiv., pp. 34–40.

The Oleasters. The Garden, 1892, vol. xli., p. 352.

The Skimmias. The Garden, 1892, vol. xlii., p. 133. The Broom and its Allies, p. 188. The Juneberries, p. 540.

Lilies at Kew. Garden and Forest, 1893, vol. vi., p. 413.

The Cornels or Dogwoods. The Garden, 1893, vol. xliii., p. 152. The Stuartias, p. 172. The Genistas, p. 212. On Clerodendron trichotomum, p. 504.

Flowering Trees and Shrubs. Journ. Roy. Hort. Soc. 1894, n.s. vol. xvii., pp. 56–65.

Hydrangea hortensis var. Lindleyana. The Garden, 1894, vol. xlvi., p. 466.

Horticulture and Arboriculture in the United States. Kew Bulletin, 1894, pp. 37–66.

The Magnolias. Gard. Chron., 1895, vol. xvii., p. 515.

Hand-list of Trees and Shrubs grown in the Kew Arboretum. Part 1, Polypetalae, 1894. Part 2, Gamopetalae to Monocotyledones, 1896.

W. B. H.

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**Botanical Magazine for September.**—The plants figured are: *Rhododendron Maddeni*, Hook. f., var. *obtusifolia*, Hutchinson, *Robinia Kelseyi*, Hort., *Agave Watsoni*, J. R. Drummond &

C. H. Wright, *Zaluzianskya maritima* Walp., and *Bulbophyllum galbinum*, Ridl. The *Rhododendron* is a new variety which was discovered in the mountains of north-east Manipur by Sir George Watt, who sent seeds to Kew in 1882. Like the type the variety has large white flowers, but it differs from it in its obtuse leaves and longer calyx-segments. *Robinia Kelseyi* is an attractive plant with rose-coloured flowers and pods which are conspicuous on account of their dense covering of long reddish gland-tipped hairs. The Kew plants were purchased from Mr. H. P. Kelsey, of Boston, Mass., in 1903. The *Agave*, which is probably Central American, was described for the first time in the *Kew Bulletin* for 1907, p. 322. The plant was purchased in 1906 from Mr. Justus Corderoy, Blewbury, Didcot, who obtained it originally from the Ghiesbreght Collection. At Kew it has produced neither seeds nor offsets. *Zaluzianskya* is a genus of showy-flowered Scrophulariaceous plants of 32 species, all of which are South African. The flowers which usually expand at night and are often fragrant have a long slender tube and a spreading limb. This in *S. maritima* is half an inch to three-quarters of an inch across, red or purple brown outside and white inside. The drawing was made from a specimen sent to Kew by Mr. W. E. Gumbleton, who also presented seeds to the gardens, which he obtained from Mr. Thorncroft of Barberton, Transvaal. The Kew plants died after flowering. *Bulbophyllum galbinum*, a native of the Malay Peninsula, resembles *B. Reinwardtii*, Reichb. f., but it has 2-flowered peduncles. It was presented to Kew, with other orchids, including some allied species of *Bulbophyllum*, by the Hon. Walter Rothschild.

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**Pestalozzia Cydoniae**, *Evans et Dowge*.—Mr. I. B. Pole Evans, of the Transvaal Department of Agriculture, has forwarded to Kew some twigs of *Cydonia vulgaris*, showing warty outgrowths formed by large numbers of arrested adventitious roots. These outgrowths are caused by a hitherto undescribed species of fungus belonging to the genus *Pestalozzia*. Mr. Evans sends the following diagnosis of his new species for publication in the *Bulletin* :—

**Pestalozzia (Monochaetia**, *Sacc.*) **Cydoniae**, *Evans et Dowge*.—Acervuli minuti, nigri, globosi, primo immersi dein erumpentes, tubercula ampla nodulosa formantes. Conidia fusoidea, 3–4-septata, 18–24 × 6 $\mu$, cellulis mediis fuligineis extimis hyalinis, apice setula unica plerumque obliqua ornata. Conidiophorae graciles hyalinae.

TRANSVAAL. In ramulis vivis *Cydoniae vulgaris*, *Evans*.

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**Para Rubber.**—The third edition of Mr. Wright's useful book on the botany, cultivation, chemistry, and diseases of *Hevea brasiliensis* has been received. The work has been thoroughly revised, and is considerably enlarged.

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